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THE NEUROLOGY OF SCHIZOPHRENIA

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DURING the two and a half years from May, 1953, sixty-one cases of schizophrenia, none of whom had been leucotomized, were studied by me at St. Ann's, a 69-bedded subsidiary hospital of Holloway Sanatorium, Virginia Water, which has been available for the treatment of psychoneuroses since the end of 1946 and where at any one time a large majority of the patients are psychoneurotic. Except that patients are normally expected to be in by 10 p.m. it is as open as any hotel, there is no sex distinction in any of the sitting and games rooms, the dining room, the occupational therapy department and so on and where the 'male side' and the 'female side' meet the rooms may be occupied by men or women, so that men may have to pass women's rooms on the way to the toilets and vice versa. The hospital is mainly an 'amenity bed' one with charges of 2 to 4 guineas a week and although no policy of exclusion exists the bulk of patients are from 'lower middle' or 'upper lower' backgrounds. Treatment is based on careful history-taking and investigations of various kinds, with explanatory and supportive psychotherapy, but E.C.T. always with pentothal and scoline, modified insulin, modified narcosis and other physical treatments are available although they are strictly limited by the small nursing staff. Remembering that there are only three doctors, one of whom is partly taken up with administrative duties, both for in-patients and for a reasonably active out-patient service which includes the use of all the daytime hospital facilities, an exercise in simple arithmetic will make it clear that the forms of psychotherapy used are also strictly limited.

Admission is by simple arrangement, there is no voluntary form and no right exists to detain an unwilling patient for a single minute. This situation has provided an opportunity to study schizophrenics away from the atmosphere of a mental hospital; it is hardly an exaggeration to say away from any kind of hospital atmosphere. Of course they have come for medical help, but most have been sufficiently stabilized for treatment to be based on general psychotherapy. For all that, some very advanced and chronic cases are included and there has been no selection except the qualifications that every patient must have been interviewed in the usual quiet, consulting room manner on at least three occasions each lasting about three-quarters of an hour and must have exposed unequivocal delusions under these conditions of calm friendliness. Thirty more probable cases of schizophrenia were observed during the same

period but they are excluded in order to ensure as far as possible that the diagnosis is unquestionable. The accent in this paper is very much on the facts observed during the period mentioned while the patients were composed and in a suitable state for psychotherapy, but reference will be made to their histories and to their progress out of hospital and especially to the 'acute' symptoms which are prone to develop and which, although this applies to none in this group, sometimes dominate the clinical picture for years on end.

Forty-six of the 61 had been in mental hospitals previously with a diagnosis of schizophrenia, 15 of them twice, 4 three times and 1 patient on six occasions. Of the other 15, in only one had schizophrenia been suspected and in only 3 more was the diagnosis made at the first interview, so that 11 patients were under observation and usually in hospital under treatment for psychoneurosis while the diagnosis gradually or suddenly became clear and 4 of these 11 were among the 12 patients who have since gone on to mental hospitals. Eight of this 12 are now back at home.

In the matter of diagnosis, information gained from the psychiatric social worker, the nursing staff and particularly from those relatives most affected by the symptomatology of patients was invaluable in providing leads for clinical enquiry. A helpful relative may direct attention in a few minutes to symptoms which would be missed during interviews spread over months. In this paper double inverted commas are restricted to patients' statements as near verbatim as I could take them down, or to extracts from patients' letters.

There were few communal difficulties despite the complete absence of segregation and restraint, although psychoneurotics are more susceptible than healthy people to any evidence of 'insanity'. A few schizophrenics were solitary and some showed unusual behaviour, and two patients had to be quickly certified and sent elsewhere after developing acute phases. In the social life of the hospital, including the dances and games, the schizophrenic women were rather more solitary than others, a difference not noticeable among the men, largely because they stimulated the motherly interest and encouragement of older women.

Although schizophrenia is the subject of enquiry, as a contrast and comparison all cases of anxiety state or anxiety psychoneurosis in the same age group, acute or chronic, admitted or seen as out-patients by me during the same period, excluding those with decidedly-worded qualifying diagnostic tags such as 'with marked depressive features', 'in a strongly obsessional personality' and so on, have been analysed in so far as clinical facts are presented concerning the schizophrenics. The same minimum of three interviews was demanded, but otherwise there was no selection. The fact that the total number is exactly sixty-one is a coincidence. There is no demonstrable difference in the social background of the two groups.

Of the schizophrenics 35 were female, of the anxiety cases 29. Forty-three schizophrenics were in-patients compared with 53 anxiety patients, the age range in schizophrenia was from 18 to 54 with an average of 31.4 years, of the anxiety cases 20 to 54 with an average of 37.8. All 122 patients had a negative W.R. and differences in haemoglobin level, E.S.R., blood urea and blood pressure were negligible except that the male schizophrenics had an average blood pressure of 132/81 and the anxiety cases of 145/85, but even this difference disappears if the 3 patients with a sustained systolic blood pressure of 180 or over (all anxiety cases) are excluded. A large number of histamine skin tests and white cell counts were recorded but showed no differences, and the urine of every patient was examined, repeatedly if necessary, with only a handful of

each group showing sugar on the first examination. Six of each group were recorded as exhibiting marked physical signs of anxiety, and 4 of each group showed distinctly cold extremities or complained of chilblains. Three of the anxiety patients had had treatment in mental hospitals and one is known to have gone to a mental hospital for treatment since the period of observation.

Recalling the opinion of Gaw *et al.* (1953) that more schizophrenics than psychoneurotics are seen as psychiatric out-patients, it should be pointed out that no deductions concerning incidence can be made here because cases are sometimes referred from Holloway Sanatorium for after-care and we admit a little more boldly than would otherwise be justifiable in such a hospital because we have Holloway Sanatorium behind us.

THE BASIC SYMPTOMS OF SCHIZOPHRENIA

The following five symptoms were present as changes in every case of schizophrenia and no such adverse changes were found in any of the anxiety group. The defects which they imply were a matter of degree, so that as clear information as possible was sought of each patient's earlier level of achievement; three patients in this series were under my continual observation for more than a year before the defects became distinguishable. In every case the defects were recognized only in the absence both of nervousness in the patient-doctor relationship and of clouding or excitement however mild; the standard situation achieved was that an easy relationship had been established, improvement had been followed by apparent stability and the patient's remaining problems and especially the future were being discussed.

1. *Difficulty in Thinking and in Expressing Thoughts*

The early patient has the greatest difficulty in describing his symptoms, he is often perplexed and bewildered and as a rule he knows that some inexplicable thing has gone wrong and the experience is agonizing. "I can't sort my ideas out", "I can't get my thoughts straight", "I get so muddled", "I cannot arrange my ideas", "I should be perfectly happy if my mind would only work", "My thoughts won't work", "Thinking is so difficult", "I get so mixed", "However long I take I can't get ideas", "My brain isn't working properly", were statements made by ten different patients, some speaking with tears in their eyes. Failing insight reduces and finally abolishes such complaints and the defect may be more difficult to detect because of this and other reasons to be described.

The difficulty in thinking was frequently so severe that even simple history-taking was extremely laboured. Information given was sometimes like flight of ideas in slow motion except that the words or ideas of association were missing. The understanding of relevancy was defective, the ability to convey feeling was inadequate, the sequence of thought was often broken and there was from time to time an inability to follow the simplest threads so that the doctor certainly, and sometimes the patient as well, had the feeling that the interview was getting nowhere apart from the important evidence to the patient of interest and sympathy. Such interviews tended to peter out, especially when a patient's vocabulary was poor, unless determinedly kept going.

Quite often the defect could be made obvious by changes in direction and new approaches during interviews and the less affected patients recognized the difficulty they experienced on the shifting ground of lively group conversation, a potent cause of social withdrawal, "I used to be an easy, pleasant

companion. I should not talk about myself like this, I know, but people used to like me, but now I cannot keep up a conversation, even with people I used to think were dull." Time after time I saw protective aloofness disappear in the non-demanding and non-competitive hospital atmosphere, although schizophrenic patients continued to prefer individual contacts, which can include dancing and table tennis, to the cross-talk of a common room. Insight existed almost uniformly only in the presence of a measurable intelligence well above average, often associated with an extraordinarily good memory and with appropriate anxiety and depression.

Sometimes, and much more frequently in young women than in older women or men, the difficulty in thinking was hidden by flightiness and garrulity, but the flow of words was like water running into hot sand. With or without such over-talk several showed a manneristic affectation of superiority with pompous speech, possibly not recognizable as a change unless one had discussed it with the relatives. Unusual answers and remarks were common: it was not so much that the answer to a comment on improved appearance was "I really don't know how you tell" but the oddly serious perplexity which was apparent and the conversational vacuum which followed; not that "I had a breakdown following the death of a dog" or "I accepted religion to make myself work better" were so peculiar as that they needed no further explanation. The more chronic cases showed something approaching chaotic thinking or were painfully limited to simple concepts.

2. *Reduction in the Ability to Plan*

The division into symptoms which has been adopted is clinically convenient but not scientifically exact, for instance the inability to cope with shifting problems already mentioned is brought out most fully and most obviously by the patients' declining ability to plan ahead, because the possible future can change as often as one cares to take a new look at it and the schizophrenic patient tends to find increasing difficulty in focussing a particular picture in this kaleidoscope. As with other symptoms, the defect is a matter of degree measured against previous capacities, and varies from a painful uncertainty sometimes saved by guidance to a catastrophic disappearance of the future. It is the commonest early symptom which leads to a breakdown.

This future-planning defect must not be confused with the failure to plan which must be involved in every active psychosis and in most incapacitating psychoneuroses; the defect was most obvious when the patient had become apparently well, was in good physical health complemented often by a high measurable intelligence, was not expressing delusions or worried by hallucinations and was happily integrated into hospital life; but he remained all at sea when discussing the future and could not get beyond vague remarks like wanting "something to do with art" or "something concerned with my original plans". Excluding the very inadequate and the lonely, financially embarrassed spinsters, it was the schizophrenics to whom time meant nothing who would be willing to settle in hospital indefinitely.

During acute phases, even if the defect is not masked by clouding or excitement it may not be apparent because of an intense concentration on the present which may at first appear quite natural, or the defect may be hidden by a calm acceptance of a vague, incapacitating illness, and this was so in several in this series although they had casually left jobs and even homes or had behaved in ways solely determined by immediate considerations. During convalescence it was revealed. With declining ability to plan for the future and an increasing

failure to assess the past (see later) it becomes more and more difficult to interest the patient in anything but immediate matters. Nothing could be discussed but a hostile husband or a marriage question which had to be settled or some unspecified arrangements for leaving at once, or minor working difficulties demanding instant solution, "But I must know whether to allow my mother to visit or not", "It is my spine, it is not straight", "I was sexually excited and now something must happen" and despite persistence concerning wider issues one got nowhere. Patients were strangely indifferent or dull and lacking in ideas, or restless and anxious to get going but to no particular purpose. Sometimes there was a sanguine, mildly grandiose assumption that everything would be all right, with the expression of wishes as substitutes for plans, for instance, a gay, high-spirited girl with a good school and immediate post-school record who, since her acute illness, had twice lost her place in a shorthand and typing course because of her inability to learn and her cavalierly inconsequence said "I am going to get a job that's exciting, private secretary to a big business man who travels the world, preferably by air", the wife of a man with a meagre income and limited prospects wrote "When we get a beautiful home, with plenty of horses and good riding country and good servants, after all, you can't bring up children without a cook and nannies, then I shall return to my husband. Of course I shall help in every way"; and an alert, intelligent schizophrenic young man said, referring to another patient, "You don't mind if I fix him up with a job, my firm will do anything for me" although in fact the firm in question would not re-engage him under any circumstances. Many such patients are anything but withdrawn and introspective.

The phrase "I won't decide until I'm better" can be used indefinitely and six patients calmly persisted with vague physical residues which had to be put right. Other patients threw decisions completely on to the doctor, quite separately from any general dependence upon him, simply accepting that he would, like a mother, decide what was best. In nearly half the patients there was unalterable indifference, efforts to get down to the problems ahead brought only vague, slow smiles and the expression of evasive generalities and it is not difficult for the psychiatrist to give encouraging directions and to assume that they are being noted whereas in fact they are not being absorbed at all. The complete acceptance of a very limited life is of course an everyday matter in mental hospitals.

The future tends to fragment and crumble. In 25 patients there was a complete inability to discuss possible variations in the future at all, thus a youth seen as an out-patient, whose adolescence had been complicated by homosexual experiences but who had a good school record, lost all interest in any kind of sexual activity at 19, but during the next four years completed his Army service successfully and did well as a trainee accountant, supplementing his training with extra correspondence courses. He suffered an acute schizophrenic breakdown and went to a mental hospital for E.C.T. When I saw him he had been at home for three years eating and sleeping well, somewhat effeminate in manner and fond of good clothes, no problem at all to his mother who lived with him—unless she became exasperated with his only response to any discussion of the future, that "Certain news will be coming".

There is often insight into the defect at first, a torturing situation until the patient loses it and levels out enough to accept his problem in understandable terms and to go on with his life. "The future is black and terrifying", "I am terrified of the unplanned future", "I can't see the future of anything, the future is such a threat", "Please let me die, my life is so useless", "I just

don't know what to do", have all been written or spoken spontaneously by different patients, spoken sometimes through streaming tears. A patient wrote "I have had to realize that my future is unknown and I am left with a frightening and unstable present without being able to know what to do except to move from instant to instant in the best way I can". That was in 1953 and he has moved to a mental hospital where he carries on quietly with the same philosophy. "The basis of my problem is my inability to consider the future" said a twenty-year-old university scholar and another young man who, after a brilliant performance with his O level examinations had declined into a failure at his A level subjects said, "I know in my heart that I shall never be able to do anything worth while" and this before he developed false ideas of disease and of hostile environmental forces.

The absolute necessity to plan anew will sometimes make the disease apparent. Two women in this series had broken down following the deaths of husbands. They had led supported lives and for some time after their losses were carried along by the helpful arrangements of friends and relatives and I was unable to find any evidence that the deaths as such had produced any great reaction. It was not until they moved into a vacuum that ideas of reference and of bodily changes and finally delusions of hostility developed. Schizophrenic housewives may continue to buy in supplies for the preparation of meals, make appointments and keep them and generally carry on, usually with diminishing effectiveness, until the husband threatens to leave or does so, or until they are faced with the organization of a new home, when the defect becomes apparent as something quite different from say, a reactive depression. Of course this particular sequence easily develops in senile patients whose ability to plan is also reduced. Young people at school often follow very set patterns, but the preparation for or the actual transition from school to work or university may precipitate a breakdown. Those who are obsessional by temperament fall easily into doubts of such severity that a false diagnosis of obsessive-compulsive psychoneurosis may easily be made.

3. *Difficulty in Separating Past Thoughts from Past Events*

There was a reduction in the ability to sort out from memory what had actually happened from what had only been thought, and early cases frequently recognized this difficulty, "I get confused between false and true memories", "I cannot remember whether things which have happened have really happened or not", "The real becomes apparently unreal and the unreal apparently real, how can a madman sort the matter out?"; the mistakes which such a defect favours added to the patient's guardedness during interviews; early cases and some whose illnesses were of longer duration but who were mildly affected often picked their way cautiously over the uncertain ground of the past. In several patients in this series I was able to observe the identification of very recent thoughts with 'real' events and to discuss contradictions and impossibilities at a time when the truth could be re-established; such patients never appeared to be 'caught out', only perplexed. This inability to sort out facts from fancies adds to the stress of the patient's social life and makes accurate history-taking difficult and sometimes impossible; thus a practical and out-going woman successfully earning her own living described in detail how her husband used to masturbate in public, and one could only note a possible delusion and without further evidence a diagnosis could not be made.

As the disease progresses and as insight lessens hesitation diminishes and sentences like, "My mother gave me plenty of hints concerning the truth of

my birth but like a fool I took no notice", "My mother used to confide things to me which were not true but which I believed at the time", begin to appear more frankly and finally the failure to recognize that the day-dreams of yesterday have no reality permits the development of delusions of love and power, of hate and danger.

This defect can exist when the memory is excellent and several patients had unusually accurate recording memories, but it makes recall less and less reliable as a guide to future conduct; emotional charges can be equally attached to the real and the imagined and there is an increasing tendency to select unconsciously items from memory which appeared to meet a present situation and to reinforce them with suitable emotional tension. Such false emphasis means that the true emotional significance of the past is lost and the sense of personal awareness reduced. For instance, one patient suggested as a possible cause for her predicament that "There was that frightful bazaar, no-one knew how much was taken".

4. *Failing Ability to Recognize Absurdity*

Since every schizophrenic in this series has expressed delusions in the absence of clouding and excitement this heading may seem redundant, but the failing precedes the development of delusions, is frequently recognized before they develop and is often clearly present in patients who apparently have become free of delusions. For instance, an out-patient, a man of 45, had a brilliant school career and was regarded as a reasonable certainty for an Oxford scholarship in classics; he had held a junior clerical post for more than twenty years interrupted only by one period of a few months in a mental hospital, but obsessional doubts and compulsions had forced him to 'go sick'. While improving with simple interviews he received a letter from an early nannie much older than himself and he at once replied suggesting marriage. She wrote back hastily but in a kindly way saying that she had been married for many years. This is not a simple return to childhood; the same man is single and runs a little home of his own well enough to keep himself physically healthy, has a standing arrangement with a nearby widow for mutual sexual gratification, is reasonably integrated into his community except that he rejects as a snob anyone who has been successful and finds his pleasures with the handicapped and the lowly. He exhibits no withdrawal as such in the face of simple relationships, provided that his once excellent brain is only called upon to function at a comparatively low level. Again, a youth saw no reason at all why his decision to lie in bed for six weeks should need any explanation and certainly he was unable to provide one. Another woman patient assumed that I would arrange with an acquaintance of hers, now "somewhere in Africa" for the advance of several thousand pounds to set her up in business, and two young women suggested their adoption into my family, in each case before delusions were recognized.

5. *Failing Insight*

When considering insight it is important to exclude that lack of vision which follows an inability or refusal to face a very painful situation, which expresses itself in terms of glossing over or of denial and which if successful enables the patient to make a further adjustment to life. Despite the existence of this lack of vision, there are people with the clearest conception of what their cancer, heart disease or disseminated sclerosis implies and in most of those who fail to see the picture clearly there is nothing wrong with the ability

to do so; there is a decision, which may be partly unconscious, to avoid it. The failing insight to which reference is made here is more akin to the failure which eases the approach of death.

For a patient to see his own schizophrenia with absolute clarity would be a greater agony than that produced by any other disease, however terrible, and the desire to turn away from it would be overpowering, but in the early stages there is sometimes a nearly complete view of imminent catastrophe and for a time the patient is held by the prospect in a state of fascinated terror before he either breaks down into a state of clouding or takes refuge in some mental mechanism which reduces the pain. There is always some impairment and the unbearable is usually made bearable, although sometimes only just. An acute illness can subside so that there is something approaching a complete recovery and the loss of insight may be just enough to allow of an interpretation which is acceptable to the patient, but in the long-term case when the disease is that much more extensive insight is considerably reduced, and in several of the patients in this series one could as easily persuade a lovable spaniel of the importance of the hereafter as get them to comprehend the true gravity of their disability; in fact, because simplicity of direction is essential to their welfare one can strike them with the most flinty truths without raising a spark of insight or response in any true sense.

The following table gives as accurate a picture of the insight of the patients in this series as is possible of a scene the parts of which overlap and which is constantly changing. Generally speaking insight becomes less from 1 to 5 and changes are usually in a downward direction. In other groups with more severe and chronic cases there would be more included under 3 to 5, whereas the more mild and early cases seen the more there would be under 1 and 2. It is not suggested that patients go through this series regularly or that the level of insight corresponds exactly with the severity of the disease, although there is a rough correspondence, for sometimes advanced cases had a dim, pathetic recognition of their helplessness.

TABLE I
"Insight"

The patient considers the illness:

I.1 As a grave mental illness	..	..	..	..	..	..	6
I.2 As a milder nervous, psychological or mental illness	..	..	..	..	..	..	16
I.3 As a reaction to hostile environmental stresses	..	..	..	..	..	..	21
I.4 As a physical illness needing treatment	..	..	..	..	..	..	5
I.5 As non-existent	..	..	..	..	..	..	13

Concerning I.1, patients were always early or recurrent and it was most commonly found during adolescence associated with considerable distress, although some young patients had lacked insight from the beginning and never appeared to suffer unduly, the defect and the inability to recognize it having marched together and only the relatives having been alarmed at the change. Two patients in this series had diagnosed themselves as suffering from a 'split mind' and one of them had read the subject up fairly deeply. Another patient said "I know I'm mad and the humiliation of it!", and another, tortured by a certainty of insanity, said "If you had known me two years ago you wouldn't recognize me now I am not the same person".

Re I.2, this covers a diversity of patients, but all recognized the need for psychiatric treatment. Generally speaking there was a rough correspondence between the degree of insight retained and the fear expressed as denial, "But

I'm not really mad, I know that", "I know I'm neurotic but I do my best", or the rejection of madness may still include a fear that the children may be tainted.

There was occasionally a searching self-analysis, a hunt for a cause linked with sexual, familial, social or working problems. The problems concerned, especially if sexual, might still be powerfully suppressed, as if the patient were saying 'You can treat me but you mustn't ask questions' but much more commonly patients moved easily into a discussion of their difficulties, compulsive thoughts, impulses to perversion and so on, and could be greatly helped by sympathy and understanding. More frequently than not patients in this sub-group at first had been accepted psychiatrically as suffering from an anxiety state, a depression, and so forth. (This applies to the early history of the whole group.)

Most of the patients in this group complained of the results of the very difficulties from which they suffered but without understanding their seriousness, they were worried by the loss of friends, by failure at work and by the difficulty of deciding future aims. Commonly such patients are thirty or older and some had asked for psychiatric help, but a few were very young; thus a perplexed girl said, I think accurately, "But the others taking the course are much less intelligent than I am and they manage all right", and another high-spirited young woman said, "I have lots of interests and I love life but everything is stuck".

Re I.3. This is the most typical, and as a rule is accompanied by diminution of insight into communal and ethical demands. Illness and incapacity are seen as a result of tensions and pressures created by a hostile environment and especially the personal hostility of those who should be most loving, husbands, wives, parents, children, etc. Some see life as a struggle to attain freedom from domination and often such a convincing account is given and the reaction seems so appropriate that a false diagnosis is made. There is no recognition of internal failure, even immediately following an acute episode with clouding, delusions and hallucinations. Sometimes there are odd flashes of insight, one youth said after E.C.T., "For a short time after treatment life seems to be spontaneously self-satisfying but I get clogged again" and when 'clogged' he returned to his belief that his illness was a natural sequel to parental domination and misdirection.

Sometimes a patient appears extraordinarily evasive and it may be a long time before it is appreciated that the patient is not avoiding the point, it is just that he cannot keep to it and that there is an absolute inability to grasp the position in terms of personal inadequacy or of the problems which the history and the information from relatives have exposed.

One girl wrote "I believe I have a lot of intuition as exhibited by my feeling at once of intrigue, jealousy, wickedness, etc., but I often do not know what course to take. Certain amount of physical courage, but I lack moral and spiritual courage. Mental courage, fair. Have above the average intelligence, usually good spirits and love. Confidence in myself doing various things. I have weak lumbar vertebrae. The insulin has completely cured me." The writer believed that her mother cursed her when she died, "with a split mind or something like that" and that her sister poisons her father's mind against her. She had an excellent working record for a few years but since has repeatedly failed to achieve any working or training success or to consider this as important. Quite frequently there was recognition of moodiness, impulsiveness and dramatic conduct, often with suitable apologies but not with real insight.

Re I.4. Two of the five patients in this group were mildly bewildered although otherwise complacent at being sent to a psychiatrist, the other three saw no contradiction and therefore had rather more insight than was apparent. Two of these patients actually had ulcerative colitis which formed the basis of physical complaints but neither saw anything contradictory in treatment by a psychiatrist. One of the group who was "terribly run down" came for treatment of her "rheumatic heart" as an out-patient but the consultation passed easily into a discussion of her homosexual difficulties and of her coolly expressed passion for me ("I thought perhaps you wouldn't encourage it"), and of other problems, especially the difficulty of earning a living. Mostly they expressed their feelings in such phrases as "I shall be all right after a rest", or "I need more interests I know".

Re I.5. There is no insight in this group except that implicit in suspicion and hostility towards almost everyone, including sometimes the psychiatrist. "Naturally I am suspicious and hostile because I was once shut up and I distrust everyone", said a patient who had been equally suspicious before certification some years before. More often a complete absence of insight concerning any kind of illness is accompanied nevertheless by a calm acceptance of the attitude summed up by 'The doctor knows best'.

OTHER FINDINGS

A. Measurable Intelligence

The main and invariable symptoms which characterized the disease have been described and they involve a very serious reduction in intelligence although not necessarily in measurable intelligence. To repeat, if insight is not seriously impaired the patient often recognizes this, "I am definitely less intelligent than I was" said a patient with a 95 percentile Matrices, a 14+ Kent Oral and an excellent Mill Hill vocabulary score. We have no psychologist attached to the hospital, so that intelligence tests are limited to the Kent Oral and a series of nine fables to test the power of generalization, which are performed in the consulting room when rapport makes them reliable; besides this the hospital occupational therapist arranges for everyone, in groups of six, to spend an hour with Raven's Matrices. Both the Raven's Matrices and the Kent Oral are well standardized, the latter taking 5-15 minutes to carry out.

The fables are taken from Aesop but the 'morals' are omitted, in fact this series of nine were chosen so that repeats can be carried out if necessary and in each set the fables become longer and more complicated from No. 1 to No. 9. I began to use them in the belief that the poor power of abstraction so often noted in schizophrenia would be brought out by the test, which takes up to twenty minutes to perform. In the test, the patient is given the first card to read together with a full explanation of what is wanted, i.e. some generalization (G) which could follow, preferably as applied to human beings. After the first card, if the patient has failed or there is any doubt at all about his understanding, examples are given in illustration and this process is repeated as necessary within the limits of leaving confidence unchanged. For the purpose of this paper only the ability to generalize has been scored, e.g. concerning the fable.—A vixen sneered at a lioness because she never bore more than one cub. 'Only one,' she replied, 'but a lion',—the standard answer is "Quality but not quantity" given by about a half of those tested. Less satisfactory answers. "One good one is worth a half-dozen mediocre ones", "Better do one thing well than a lot badly", "Nothing but the best", all scored one. Difficulty occasionally arises with an off-centre answer such as "If you cannot have what

you want, be content with what you have" for which a half was given. The answer: "The ridiculous suggestion that things are only good in large quantities or if they are big" also scored a half. The answer "Even if only one, it is one of the major animals" is only a comment in which the person tested cannot get away from the literal story (C), sometimes the patient can get no further than to repeat the story in his own words (R) and occasionally he cannot even do this (N).

No healthy person I have tested has scored less than G.4, with a Kent Oral of 14 and a 90 percentile in the matrices and the commonest score with 14 or 14+ and 90 or 95 percentile is G.6 or 7, but to my surprise the results, although showing the loss of schizophrenic superiority (see table), showed that the anxiety patients were hardly any better than the schizophrenic, and sometimes, taking extreme examples, one might get in schizophrenia 14+, 90 percentile and G.6 on one occasion and 14+, 75 percentile and G.5 on another, whereas a smart and superficially intelligent young man shortly before returning to clerical work after an anxiety illness scored 14+, 90 percentile and a G.0, in other words, with every kind of encouragement, help and praise he could not generalize at all, while a recovering and discharged anxiety patient, an alert shorthand-typist who was being seen as an out-patient, scored 14, 90 percentile and G.1. This is in line with the large proportion of young adults unable to assume the abstract attitude, including some with average verbal ability, reported by Hopkins and Post (1955).

TABLE II

				Schizophrenia	Anxiety
Average Matrices Score	..	..	..	79	57
Numbers with 95 percentile	..	..	..	12	7
Numbers with 90 percentile	..	..	..	2	6
Numbers with 75 percentile	..	..	..	7	8
Numbers with 50 percentile	..	..	..	5	3
Numbers with 25 percentile	..	..	..	1	3
Average Kent Oral	..	..	..	14.2	13.9
Numbers with 14+ (=15)	..	..	..	16	9
Numbers with 14	..	..	..	3	12
Numbers with 13	..	..	..	6	2
Numbers with 12	..	..	..	2	3
Numbers with 11	..	..	..	0	1
Average Fables Score	..	..	..	2.5	2.8

Only 27 of each group are included because that is the number for which all results are available, chiefly because the fables were introduced late.

At first sight it might appear as if schizophrenia does not affect measurable intelligence, but these figures do not indicate the common brilliance of schizophrenics which has subsided (see later) and even more the deterioration with time which is usual although not invariable and which is brought out in the next table (Table III), where Schizo. 5Y— refers to schizophrenics with a history of

TABLE III

	Schizo.		Schizo.		Anx.		Anx.	
	5Y—	(No.)	5Y+	(No.)	5Y—	(No.)	5Y+	(No.)
Average Matrices Score	90.5	(18)	53.3	(36)	73.1	(36)	82.3	(22)
Average Fables Score ..	3.9	(8)	1.9	(19)	2.9	(20)	2.5	(9)
Average Kent Oral Score	14.3	(16)	13.5	(31)	14.1	(35)	14.1	(21)

symptoms of less than 5 years and Schizo. 5Y+, schizophrenics with histories of longer than 5 years, and similarly for the anxiety patients (Anx.).

In schizophrenia, measurable intelligence is reduced roughly in proportion to the duration of the illness, in this series the patients with outstanding intelligence were almost uniformly young and some of the chronic patients scored hardly better than feeble-minded persons, particularly if one ignores the Kent Oral results which are based on knowledge acquired.

Among the young ones of high intelligence several appeared dull and stupid when discussing their plans and difficulties. Failure of abstract thought occasionally becomes revealed accidentally, one girl failed completely to comprehend the possibility of composing a crossword, i.e. of putting words in without the clues, and a young male student when asked, following up his own line of religious discussion, what would have been his religion had he been born in India, replied "I should have grown up in the Church of England faith of course".

One has to be cautious with anything so many-sided as measurable intelligence. Hebb (1949) has pointed out that about half the English-speaking American adults who earn their living and conduct their own affairs cannot complete analogies like 'Foot is to ankle as hand is to ——?' but these results confirm those of earlier workers using a variety of tests. Gibbs (1923) described scholastically competent young schizophrenics who suddenly began to fail with their studies as a first symptom. Cameron (1938a and b and 1939), Kasanin and Hanfmann (1938), and Hanfmann again in 1939 reported most convincing evidence of the development of a peculiar form of mental defect in chronic schizophrenia, since all three took the greatest care to exclude any results not obtained with the co-operation and friendliness of the patients. They found grave mental deterioration, loose thinking with loss of exactness and clarity, a surprising inability to assess relationships despite the preservation of considerable knowledge, either in the presence of partial insight and sensitivity or, worse, in the complete absence of either. I have been struck in this series by the inability of schizophrenics to organize and utilize retained knowledge. The investigations followed Goldstein's demonstration of poor concept formation and failure to solve problems, the 'concrete attitude' found in seniles and schizophrenics (1936, 1939a and b) but Cameron showed that the formality, perseveration and restriction shown by senile patients were missing and that the profound lack of self-criticism and understanding made the defect totally unlike anything seen in normal childhood. Levy and Southcombe (1952) with the Wechsler-Bellevue Intelligence Scale and Burstin (1954) with the Rorschach have further confirmed the intellectual loss.

Moreover Potter's (1933) original observation that a good many institutionalized mental defectives are infantile or juvenile schizophrenics who have run their course early has been confirmed several times (Richards, 1951; Raub *et al.*, 1952; O'Gorman, 1952 and 1954) and Richards demonstrated that these schizophrenics lack a quality which makes them more difficult to rehabilitate than are ordinary defectives and Hilliard and Mundy (1954) have commented on this special, extensive defect. The schizophrenic defective can be kept in good health, he lacks tension and drive and has simple wants, reads very little if at all, but likes the movement of films although he cannot grasp any but the simplest stories. He may retain woolly delusions but is in no need of restraint, rather he sadly wants the ability to take full advantage of possible freedom, so that Bickford (1955), following Rees at Warlingham Park, can report a parole record of over 90 per cent. at a mental hospital.

B. Learning

More than intelligence, the ability to learn is reduced, as indicated above. This has been shown repeatedly by the failure of patients in this series to tackle further courses and it is also brought out by their histories.

Five schizophrenic patients were never much good at school, and several more became unstable with examination nerves and ducked the actual sitting, in four cases there is a record of faints or blackouts when the examinations were approaching and such emotional attacks make an estimation of any learning failure impossible. In ten cases however the examination results were inexplicably poor and there were fifteen in this series who eventually failed badly after earlier outstanding examination achievements. Several patients made spontaneous complaints that they had found learning difficult since becoming ill, "I find it such a strain to keep up a high level of work", "Fellows I used to beat easily are now ahead of me", although more often there was an easy confidence about work, in a job or in the home, together with ample evidence from relatives not only of a reduction in ability to learn but of an increasing failure to cope with tasks previously managed. I tried hard to coach one improving nurse in the elements of nursing, using a simple nurses' text book, but failed badly.

C. Use of Words

Several patients appeared to have difficulty in finding words and some showed perseveration. Words were commonly omitted in speech and letters and sometimes at least I think this was an expression of organic defect since explanations like the denial of self for the frequent omission of the personal pronoun 'I' soon wear thin. Prepositions, adverbs and verbs all suffered some degree of omission. A mother said of a gifted engineering student who had levelled out as a permanent junior in an electrical laboratory after several years of illness, "He only became so pedantic in his talk from the time of his illness", and this man's intelligence scores were matrices 95 percentile, Kent Oral 14+, Fables G.1 and Mill Hill Vocabulary 3—. Comments by the family such as "She speaks in such a funny way now" were frequent. The following extracts are from one short letter from a schizophrenic in this series, "May I please to develop on the matter", "My husband has been most reckless on a capitalizing basis . . . he has played on the advantage over my ignorance to some unfair degree", "I have great agitation in continuing to keep a pedigree dog . . . my hands are bursting to be free. The two budgeries also are a load of mess and an imposition on me in the dining room." Certain mental hospital patients go on to jargon aphasia.

D. Loosening of Repression

(i) *Sexuality.* Schizophrenics, as compared with anxiety patients frequently exhibited a flood of easy sex talk. At the level of psychotherapy possible at St. Ann's anxious patients gave more or less direct answers to direct questions and there was commonly discussion concerning sexual difficulties, masturbation, seduction, disappointments, inadequate or over-demanding spouses, etc., and recognition of a need for changed attitudes, but the discussion was plain and practical.

Fifty-three of the schizophrenics discussed sexual matters more freely than any of the anxiety patients and quite often very much more freely. The following arrangement of sexual topics overlaps in practice, and patients by no means

keep to the order in proportion to the severity of their illness but it is a reasonable picture of increasing clinical deterioration. The order may be biased towards Freudian psychology, since this appears to me to offer the best explanation, in fact I know of no more striking evidence available to a non-analyst than the ideas expressed by schizophrenics. Not infrequently the luxuriance of sexual pre-occupation was an antithesis to the patient's otherwise very limited ideas.

S.1. Guardedness, with obvious tension, fear, guilt and hostility, to a degree not seen by me in anxiety states. Two young women could not be brought to discuss sex at all by any means within the bounds of the existing doctor-patient relationship. Three women and one man were disturbed by compulsive obscenity in a manner reminiscent of some tense obsessionals.

S.2. Hardly more than half a dozen spoke of sex more or less in the same way as anxiety patients. One woman and three men seemed always to have been completely indifferent to actual sexual experience. Two girl friends interviewed me asking specifically for advice and help because of the utterly disappointing behaviour of the men with whom they were concerned.

S.3. Otherwise, there was free and easy discussion of sexual experience and ideas, of needs and wishes, of masturbation and of the milder perversions; a large number were casual and offhand. Speaking generally this was the standard pattern, sometimes coloured by previous psychiatric experience. "The child in me must be reassured that nothing terrible will happen if I do take things by sexual means", "I want to be castrated to free me from the Freudian drive". One man was obsessed by his failure with women and with the guilt he experienced at the consequent impairment of *their* health. Two women were moving constantly from job to job because of imagined interference with their genitals. Confined to the schizophrenic group was the conviction held by parents and relatives that the patients' expressed need for sexual satisfaction was in fact the cause of the illness and I have been urged by relatives of two of the patients to arrange means for helping them in this essential way. One sister of a naturalized alien wrote, 'There are things which it is natural to do, cannot she be helped?'

The profusion of sexual ideas was commonly associated with the certainty of disease, decay or distortion of the penis or of unnatural changes in the testicles or in the semen. Women were often concerned about drying, shrinking and disease of the genitals.

Particularly at this level the patient can be helped considerably, especially when failure to control sexual thoughts co-exists with tension, fear, guilt and hostility, "I have always known that I shall be punished for my thoughts", "Hell for me is quite certain", "Someone whispered 'I wonder if she knows the colour of a period'." Many patients gradually became easier with their problems as they stabilized and were able to return to ordinary activities although almost always at a lower level of general achievement.

Three heterosexual women and two men who discussed homosexuality quite freely made overtures to me, quite simply in words, but I had the impression that the possibility of any active response on my part was not included in their train of thought. There was no difficulty in management, a striking contrast to the transference situation in analysis with more complete patients. One woman was extremely frank in her assumption of a love relationship with me in letters only, at interviews she made only oblique references to what she had written. Two women indicated that they would not develop a sexual relation with me out of respect for my wife. Two others, both married, spoke as if I had had sexual intercourse with them, one developed acute clouding and was transferred to Holloway Sanatorium and the other steadily improved

and returned to her husband and child. Three of the women were attractive and flirtatious and talked freely of sex but in fact an underlying fear of pregnancy made them reject any physical contact with men.

On the other hand five women and three men had had illicit love affairs under circumstances which suggested that their moral standards had declined during the illness. One of the men and three of the women had attacks of acute sexual appetite. Two further men, both single, had regular intercourse with a woman friend and a homosexual had frequent sexual experiences in the belief that this was essential to his health. A charming well-preserved girl had found difficulty in benefiting as much as she would have liked from psychotherapeutic interviews with previous doctors because of compulsive ideas of cunnilinctus concerning them. This information was volunteered easily at the first interview; in psychoneurosis such frankness is almost inconceivable. Although many were utterly or relatively indifferent to sex experiences this was by no means universal, and some advanced and chronic cases regularly enjoyed normal sexual intercourse. This is in line with the ordinary mental hospital observation of the shameless eroticism with which one is sometimes confronted in disturbed wards especially on the female side and with the continuation of frequent masturbation.

S.4. Homosexual preoccupation. Seven men expressed distress at homosexual ideas, one was almost distraught. Four more men spoke easily of homosexual experiences or preoccupations as did three women. Two men were regularly practising homosexuality, one strictly on the grounds of health only, and two women, one married with two children, were actively homosexual. Two more men had had a revulsion against homosexuality which had gradually lessened until the practice was accepted and one of these had finally lived as the home partner of a professional prostitute who got his living widely elsewhere, but the patient was finally thrown out by the professional because of his dirty ways and obscenity. A further man had been a practising passive homosexual between the ages of fourteen and nineteen but for several years had been asexual as far as could be told. One man believed himself to be a woman. Another man wrote "I created out of some ectoplasmic substance (Lodge's *Aether Analogy*) a female body, a definite projection of myself. Upon this I lay face down. Link this with what I know, admittedly little, of homosexuality. I have also turned the body round and have had normal relationships with it."

It will be clear that the profusion of homosexual ideas in this series was heavily weighted on the male side.

S.5. Bestiality and the grosser perversions. Animal life in connection with sex almost uniformly concerned dogs, although one patient felt her illness was due to swallowing spiders and another to swallowing flies, and there were also many dreams of a sexual nature involving lions, horses and other animals, which might express terrifying situations or great attachment, e.g. one of the young schizophrenics who never could be brought to any recognition of sex as a reality even in thought dreamed of sleeping with her horse in a small place off the kitchen; she had previously dreamed of being attacked and mutilated by wild animals but the gentlest attempt to associate "animalism" with these dreams was met by complete non-understanding and blankness until we moved on to some other subject.

Three men and two women felt that dogs recognized and exposed their sexual abnormalities, another woman said, "I'm afraid of dogs, they excite me sexually". Two women and one man had masturbated dogs and one of the

young women had sat up through the whole of one night repeatedly masturbating her dog and she volunteered this information without embarrassment. Some felt that people made animal noises and gestures at them and two men and one woman had been "followed into hospital" by dogs. One said "Dogs are purposely made to do things for my benefit", and another, concerning a mental hospital in which she had recently been, "People were turned into animals, I saw it with my own eyes".

S.6. Gross obscenity colouring fantastic delusions.

(ii) *Hatred for the Parents.* A brief description of the commonest hatred will illustrate this emotion in schizophrenics, so rarely exposed in anxiety patients.

It was common enough among the anxiety patients to hear criticism of the parents but at the level of enquiry possible it rarely went beyond such facts as "They were both unstable", "My parents were completely cold to us", "My mother had dreadful tempers", "My mother ran the show, she was very domineering", "My father was always complaining of something". In 37 patients there were no strong feelings either way and there was nothing of the intense hatred expressed so often by the schizophrenics. The degree of emotional intensity varies: in well preserved paranoid patients the hatred may be terrific; one man keeps himself near wasting point in order to deny his mother the vampire sustenance that she needs to survive, he recognizes that her vampirism is a mental process but sees no contradiction in this concretization. A quiet self-possessed man, who had come to hospital straight from a responsible post, was finding difficulty in keeping his dead father separate from an avenging God and believing himself to have been rejected by his father for his disobedience and hostility he believed Hell was certain, "My father cast a spell on me, there is no escape, I am doomed". Five patients believed themselves to be actively and maliciously persecuted by their parents. On the other hand, remarks like "My mother left a curse on me to spoil my father's life, she was jealous", "I hate my sister, she is jealous of my father's love for me", "My parents have always hated me", may be accompanied by no obvious emotion. The same female schizophrenics who were completely blank concerning sex also avoided absolutely any discussion of parental relationships.

Ten female and three male schizophrenics hated the mother, who was generally alive but sometimes dead, and attributed much of their predicament to her. Three men and two women hated their fathers to a pathological degree. Three daughters had a pathological attachment to the father and two sons to the mother. Two of the female patients had slept with the father in the mother's absence, without actual intercourse I think, but with considerable emotional stirring and one of them developed tremendous tension, guilt and hostility concerning her father.

As long as insight is preserved the situation is controllable by ordinary methods and the intensity of emotion often died down with improvement in the total picture. Insight may diminish without lessening of the emotional tension and conduct then becomes grossly abnormal.

It would probably be justifiable to add the two further symptoms, a reduction in general intelligence and a loosening of repression, to the basic five already listed, but they are more often not discernible in the early stages.

E. *Emotional Disturbances* (see 'Reactions' later)

Anxiety symptoms indistinguishable from those of an anxiety state are so common as to be almost uniform in patients seen early, but in several patients

in this series the anxiety symptoms progressed to a state of emotional tension producing torment beneath a frozen exterior or pallor, sweating and an appearance of suffering and exhaustion even more disturbing to witness than the ordinary acute signs of anxiety. There was another difference, that the expressed terror of imminent catastrophe, of an explosion into uncontrollable violence, of impulsive suicide, nymphomania or senseless screaming was much more vehement: one patient was terrified of sleep not because of the association with death but lest control should be lost, another made a propitiatory offer to take a sedative in the morning, when she felt she could hold off its effects, instead of at night, another was afraid to eat or to take medicine lest the satisfaction they produced might remove control long enough to cause disaster.

The external rigidity may be such that one is surprised to find on what a volcano the patient is living, "I am terrified I shall strike out and smash", "I know something terrible is going to happen", "I do not feel insane at all, only ill", "Tell me how to handle the dreadful waves of tension and how to stop wanting to scream and smash", "I feel I am losing control, things are getting beyond me", "Something is going to explode", "It comes when I wake, it is indescribable", one patient begged for intravenous pentothal because of the relief it had given him previously, another for intravenous methedrine which had enabled him to throw off a terrifying sense of hopelessness. Where struggles to control awful thoughts or tension were not observed in hospital there was often evidence in the history of such early experiences. In 45 cases there was a history of excitement and abnormal behaviour, by no means confined to those who had been in mental hospitals, often with violence but seldom with dangerous violence. In ten there was a history of frightening rage attacks. There were no episodes of catatonic stupor in this series either during the period of observation or in the histories, although several had suffered what can be described as catatonic excitement. That the basic symptoms of schizophrenia are developing would be enough to produce this reaction, but it does seem to me so different in quality from even intense anxiety and so colossally threatening that I think it is a manifestation in its own right.

If the disease progresses there is a continuing reduction in emotional response and, together with other mental changes, this leads on to the special form of quiet mental defect already mentioned; in several chronic cases in this series previous turbulence associated with considerable competence had subsided into quiet ineffectiveness and they were left with simple, superficial minds dressed in the faded finery of old and decorative delusions. Some of the patients in this series retained partial insight into the quiet phase and expressed perplexed recognition of their own lack of warmth. Two patients described spontaneously their inability to share the pain suffered by relatives and friends. (It will be known of course that the continuous, continual, spasmodic or occasional heightening of emotional tension can go on for many years in certain patients, especially in many who are in mental hospitals.)

Coincident with the reduction of emotional tension there is a striking reduction in the need for sedatives, forty patients in this series were taking no sedative whatsoever at the time of the review and four more only needed them very occasionally. Of the remaining sixteen alive, eight were taking barbiturates, three of them in large doses, and eight were taking largactil only. Three patients who had been on barbiturate and largactil had given up the barbiturate spontaneously but continued with the largactil. Of the anxiety patients, 51 had more or less integrated sedation into the pattern of their lives.

Between intense emotion and extraordinary apathy there is every degree

of loss. It is typical of the illness that arrest, at least for long periods, can occur at any level, and often there are varying degrees of emotional response in the same patient. One young woman with a history of symptoms extending over several years became a mother and champion (and was quite willing to be the lover) of a male patient, and several more were known for little kindnesses done here and there although they tended almost uniformly to lose the sense of emotional perspective concerning past events.

Several patients stated that they remembered clearly that as children they were struck by the happiness and spontaneity of other children and that even then they had recognized that there was a lack of emotional response towards their parents. Some of these were temporarily in the intense state of emotional disturbance to which reference has been made and this phase of emotional flare is matched by the period of intellectual brilliance which is often a feature of the disease (see later).

F. Hallucinations

These were not prominent in this series during the period of observation and when they occurred they were largely in terms of ideas (Messimy, 1953). "My own mind seems to talk to me", "It seems as if I am talking to myself all the time", and even when more obviously hallucinated, "I heard people ridiculing me", the details of sensory experience are vague, and the same applies to a dead father's voice saying "You are doomed", and to a message "You must leave your husband". Pressed about words addressed to her by a known but unseen man, a patient said, "I cannot remember the exact words but I know what was in his mind". In other words such hallucinations merge into false memories and delusions.

If one confines the term hallucination strictly to a false experience in terms of sensation, even where it is absorbed into a delusional idea, the rarity is striking. Twenty patients who had been in mental hospitals with the diagnosis of schizophrenia, and in each case in my opinion the diagnosis was unquestionable, had never been so hallucinated, although several of them described ideas of persecution in terms which could loosely be called hallucinatory. A further eight who had not been in mental hospitals had never been hallucinated. Nevertheless periods of active hallucinosis either in the history or during observation were more common than not and were usually associated with acute attacks, developing when the basic symptoms had already rendered life difficult and often associated with acute clouding and leading to urgent hospitalization. One patient in this series had gone into a state of excitement, tension and clouding leading to certification on three occasions, each attack beginning with florid visual hallucinatory experiences of lights which tormented her and seemed to become directed at her in a purposeful, hostile way, but these attacks occurred against a background of quiet, almost languid ineffectiveness out of keeping with her successful school life.

I have studied cases whose first complaint was of hallucinosis, the patients being adequately descriptive and perplexed but mentally sound, the basic symptoms being delayed for a year or more, but such cases are rare and there was none in this series.

Of the 61 patients in this group and during the period of observation auditory hallucinations and hallucinatory somatic experiences each occurred in seven. The somatic hallucinations all occurred in females, six of them had a strongly sexual colouring and in four vaginal penetration was concerned. Of the auditory hallucinations two heard actual whispering but there was little

clarity in the sounds heard or ability to describe them in detail, possibly a fusion of illusion and idea. Two of them had had "special experiences". Two patients attributed hallucinatory remarks of a hostile nature to other patients. Four complained of smells, one concerning himself and three concerning others. Two complained of visual hallucinations concerned with spiritual experiences. The hallucinatory experiences were prone to develop at night, preceded by increasing fear and tension.

G. Clouding of Consciousness

The basic symptoms already described tend to confuse the patient; at least forty-four of the schizophrenics being reported upon suffered at some time from a vague but sometimes urgent sense that something was wrong, associated with bewilderment and perplexity, during the early stages of the disease.

In proportion to the preservation of insight and to the intensity of the struggle to keep going, to the acuteness of the attack and to the pressure of extraneous circumstances, the patient is liable to fail to maintain his integration with his environment and to become acutely clouded, with the development of panic, misinterpretation of reality, false recognition of people, sounds and sights and of unpredictable conduct. This can be purely a 'mental' phenomenon (Devine, 1929; Parfitt, 1932) and in schizophrenia it usually is, although possible toxæmias may facilitate the process (Parfitt, 1934). The tension may increase or diminish. Frequently such a patient has lost weight and looks ill. This typical manifestation is uncommon in the slowly deteriorating patient who develops the basic symptoms without insight and in the chronically deteriorated patient, so that its presence improves the immediate and perhaps the final outlook (Parfitt, 1938). At least twenty-six patients in this series had had one or more attacks of acute clouding although it was rare during the period of observation. Twelve schizophrenics were admitted to mental hospitals during or after the period of observation and several of them because of the development of acute clouding. Two were sent directly from St. Ann's to Holloway Sanatorium, one of them broke down following E.C.T. and the other appeared to be gradually worn down by increasing hallucinosis with which she could not cope. The phenomenon of clouding is common in organic brain disease, e.g. in senility when the tenuous threads binding the patient's reality situation finally snap.

The dramatic development of clouding and of gross failure of insight are often mistaken for the beginning of the illness and are responsible for such headings as 'Duration six months and under', 'Duration one year and under', which I have found increasingly meaningless as one learns more, and more of the history.

CONSEQUENCES OF THE ILLNESS

There are three main consequences of the illness, working failure, failure of social relationships and dependence.

C.1. Working Failure

Many patients in this series might seem at first sight to have done fairly well following hospital treatment, but their progress must be viewed against previous promise and in general the reduction is saddening. It is well known that brilliant students sometimes are shown eventually to lack some special quality so that the prospective professor or leader in his field becomes only a reasonably

adequate practitioner in his profession, but the schizophrenic anti-climax is something considerably more serious, the prospective professor is an unstable and problematical junior clerk, if he is not out of work or supported by some family arrangement.

TABLE IV

Follow-up

	Schizophrenia	Anxiety
1. Status improved	0	4
2. Coped with further difficulties	0	5
3. Successful return to work	5	34
4. Changing jobs frequently	0	10
5. Not doing well at work	10	4
6. In protected employment	16	0
7. Unemployable	26	4
8. Undetermined as yet	3	0
9. Dead	1	0
	61	61

Notes

(1) e.g. Expanded business or started a new one, promotion at work, etc.

(2) e.g. The death of a husband, desertion by the husband, completed training for a new job, etc.

(3) Includes domestic management. Three of the anxiety cases have returned to both housework and an extra job and several are planning to some purpose, e.g. one young woman in the Civil Service is taking an extra qualification to avoid the 'black mark' of her illness.

(4) Most of these are hunting for more appropriate employment, a few are symptomatically restless.

(6) By this is meant that without considerable family support or a job made specially undemanding, the patient could not cope. The number includes five housewives.

Of the schizophrenics, 54 have unquestionably fallen from a higher standard, often disastrously. Nine patients had insight into this inability to cope with their work, in general those who knew that for some reason the brain was not doing its job.

TABLE V

Examples of Schizophrenic Job Changes

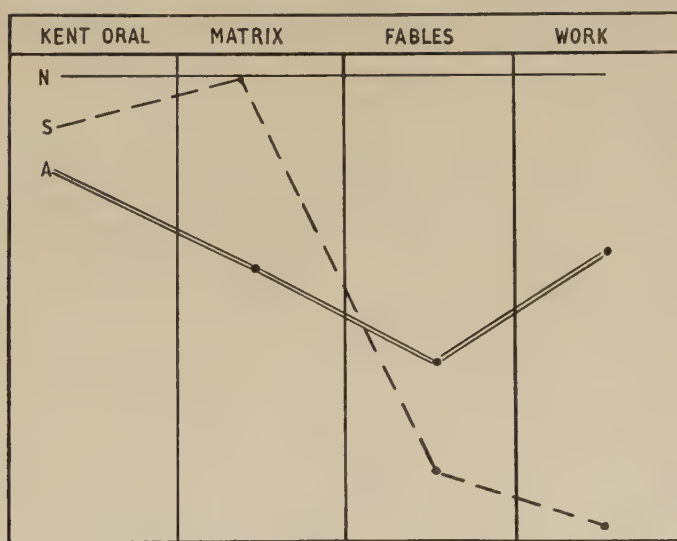
Senior chemist (Established).	Occasional work as chemist.	Laboratory assistant.	
Teacher.		Farm worker.	Home help.
Teacher.		Unskilled labourer.	
Teacher.	Occasional jobs.	Failed training.	Unemployable.
Secretary.	Kitchen worker.	Unemployable.	Hospital.
Secretary.	Nursing assistant.	Odd jobs.	Hospital.
Executive secretary.	Shorthand-typist.	Domestic.	
Secretary.	Simple shorthand- typing.		
Clerk.		Unskilled labourer.	
Senior saleswoman.	Shop assistant.	Home help.	
Shorthand-typist with languages.		Domestic.	
Manageress.	Shop assistant.		Unemployable.
Successful W.Op.	Failed student.	Work with father (P).	
Air Crew.			
Tailoress.		Domestic.	Unemployable.
Regular Army Officer.			Unemployable.
Regular soldier.	Odd jobs.		Unemployable.
Nurse.	Receptionist (P).	Unemployable.	Death.

(P)=Protected employment.

A further woman of good family, education and adequate intelligence acted as a companion-help until increasing difficulties and poor performance led to the projection of hostility and then to clouding and delusions with admission to hospital, following which the process was repeated several times between the ages of 18 and 48, before hospital settlement. Another woman is on relief after gradually frittering away an adequate inheritance and finally buying and failing to run a boarding house. Several more had been making ordinary advances in business posts or as shorthand-typists but have slipped quietly into inferior positions in which they are solitary and disgruntled.

Eleven patients did good work after schizophrenia was diagnosed, in two cases work of a distinctly creative order, two took university degrees. Of the five who made a successful return to work two are holding high-grade posts. Nevertheless only three can be said to have advanced in anything like accordance with expectations after the first diagnosis and in each of these the advance has been disappointing.

The following graph shows the schizophrenic decline, adding work results to the tests already described. The precipitate decline associated with long duration of the illness is not shown. The best intelligence test is of course the actual problem of living.



N.B. Schizophrenia - - - - -
 Anxiety - - - - -
 Normal - continuous line

C.2. Failure of Social Relationships

This is one of the gravest sequelae, the lack of resilience in thought makes friendly intercourse unpleasantly difficult, "I can see that people shun me because I have nothing to say", "I am not too bad with one, but when there are several people I cannot keep up with the conversation". There may be a life-long history of aloofness or clear evidence of an abnormality dating from childhood, "This is an accentuation of my normal personality. I find all outside influences distasteful and difficult to cope with", but in ten cases at least there was a clear-cut change from an averagely or more than averagely out-going

personality to one exhibiting marked withdrawal or a sustained, stiff pomposity which was quite out of character. Equally frequently, especially in chronic cases, there was a change from reserve to superficial social ease or to tactless exhibitionism and in these patients at any rate any explanation in terms of intense preoccupation or of being 'shut-in' would be a flat contradiction of the facts. The relatives often report an inability to continue co-operative planning, "Nowadays she won't go along with me at all", "She just does not bother about anything", two perplexed husbands said of their wives.

In the early stages withdrawal is accentuated by partial insight, it is a more or less recognized escape from the pain of exposure, but later on it is increasingly dependent on sheer inability to develop social relationships and this is completely additional to the social isolation inevitably associated with acute episodes. The fact is underlined by the good relationship which can be developed when the doctor makes all the running, when he is aware of the patient's limitations, lack of resilience and inability to plan constructively but continues to exhibit genuine friendliness which almost uniformly is accepted gratefully, but with varying emotional depth which can be very shallow. In the total 122 patients the most trusting and affectionate were schizophrenics. Cameron *et al.* (1955) have drawn attention to the sociability of schizophrenics, given friendships within their capacity.

As a corollary, eighteen of the schizophrenics were married compared with 51 anxiety patients.

C.3. *Dependence*

(a) *On the Doctor.* The schizophrenic's willingness to accept the doctor's help has already been mentioned. Despite insecurity and suspicion and even after the doctor has been moved into the hostile environment which seems to imprison the patient, his concern and interest are still sought. A working woman who believes that my incredulity has wrecked her life and hopes of marriage wrote, "I have not heard from you so I hope you are not using me as a guinea pig". In-patients and out-patients will make urgent demands for an interview when there is nothing urgent to discuss, it is re-assurance concerning the doctor's availability that is wanted. Dealing with schizophrenics mainly before, after or in the absence of acute episodes, I have found that they will generally accept without criticism a period in hospital or out-patient treatment, including E.C.T., even when uncertain and perplexed, like a dear old lady asked for her bus fare and feeling that she has already paid. A patient being transferred to Holloway Sanatorium said "I must be patient, I know and have my teeth out but I would like my holiday first". Even when frightened by ideas of aggression, guilt and sex, or only half admitting illness, "I must have had a breakdown without knowing it", "I was ill, I know, but I do not remember anything about it", or denying any illness, "There is nothing wrong with me, but I trust you, doctor", patients will act as advised during the quiet phases which form the greater parts of their lives.

Anxiety patients are often inadequate, and this applies to very many of the sixty-one to whom reference is made here, but a follow-up showed that thirty-seven have ceased to concern themselves with a psychiatrist and several of the remaining twenty-four write only to report progress and advancement. (A few may be early schizophrenics, see later.) Despite suspicion and false ideation only fourteen schizophrenics of the sixty alive have dropped psychiatric help, twelve are in hospital or under other doctors and thirty-four are being seen as out-patients or are writing more or less regularly and spontaneously.

Another view of the same aspect concerns the small number of schizophrenics who continue with sedatives compared with the anxiety patients, i.e. the need is for a personal relationship and not for chemical sedation. Loneliness and isolation encourage schizophrenic symptomatology (Parfitt, 1937b).

(b) *On Relatives.* Much more than with a doctor, a sense of rejection and projected hostility is easily aroused concerning parents and others near the patient, hatred for the parents has already been described and delusions concerning those emotionally near will be discussed but the tremendous dependence is not changed.

Most patients have worked after first breakdowns and a majority after second, particularly when they have gone back to previously learned work less demanding than original endowment would have suggested as possible but often this has come about by gradual adaptations on the part of others in the home or at work, sometimes to an extraordinary extent, occasional husbands cook, clean and shop in addition to being the wage-earner, occasional wives take over boarding houses or businesses while the husband fills in with unreliable help.

One woman was admitted for a depression and twice appeared to recover with E.C.T. but quickly relapsed, the second relapse being accompanied by florid delusions of a sexual and persecutory kind. Later, with considerable direction from the doctor, much help from the psychiatric social worker and with the interested assistance of her local priest and other friends, as well as very considerable adaptations involving home duties on the part of the husband, she got back to managing her house and child and for the moment at any rate has abandoned the idea of being set up in some lucrative business by friends whom she imagined as willing to finance her. Breakdown has been precipitated by the loss of family support and by broken engagements in this series.

Sometimes when interviewing relatives and bringing forward the serious nature of the symptoms it becomes clear that they are better aware of the grave difficulties than have been some of their advisers, but the reverse is commoner. On three occasions husbands had no idea that the wife's behaviour represented anything but a determination to be difficult and hostile, despite increasing inability to run the house, foolishness with money, a falling-off of interest in the garden and in social activities, violent accusations of murderous plots and of marital unfaithfulness which when examined were clearly delusional. Two male patients in this group lived alone with mothers who did finally seek advice but who refused to accept the illness as a serious one and kept their sons at home to be spared the slightest effort or stress, and the young men carried on without obvious symptoms, looked well, fed well, were reasonably clean and tidy and appeared to like the wireless or the television.

Reactions to the Disease. (These are usually mixed.)

(i) *Fear.* (See 'Emotional Disturbances', earlier.) The essential changes and other results in the lives of patients have been described, but of course every patient reacts to his own malady primarily with fear, except that in schizophrenia the fear is heightened by the namelessness and intangibility of what is happening. With fear come the parents, guilt and hostility. In the anxiety states fear grows out of the personality in the face of past and present stresses and very frequently there is further fear, even panic, of the effects of fear, e.g. the terror of collapse often confines the patient to the home, a result noted in several anxiety patients in this series, but there was no such effect in

any of the schizophrenics. Stresses appear in all human stories, but, as will be described, the schizophrenics experienced less of such stresses than the anxiety patients; fear does not tie them to the home, it comes spontaneously from within as a reaction to a feeling of impending catastrophe.

In this series fear has been prominent in early cases and in the histories of others wherever this was reliable. A few chronic, arrested patients only show fear that can be judged by inference, that they may be interfered with, etc., and it is often superficial and unimpressive. As has been stated already, the fears may concern the actual defects or be of disease and death in some other guise, but most striking of all is the fear of loss of control, an awful feeling that some catastrophic convulsion of behaviour will destroy them.

Fear may smoulder, flame fitfully or erupt into flaming tension and induce suicidal or violent behaviour or, with what appears to be a temporary spread of the disease, produce acute clouding. The very intense fears tend to subside but with every kind of variation, some patients remain liable to outbursts of tension far into the disease and may continue to be generally apprehensive of murder, rape and so on, but generally speaking as the disease progresses the emotional intensity grows less.

(ii) *Development of Normal Psychological Mechanisms.* All patients in the early stages were conscious of something happening which was unpleasant if not dreadful despite parental and medical reassurance, and fear was the dominating emotion. The normal mechanism which tends to operate in the face of painful situations, such as withdrawal, day-dreaming, denial of illness or defect, suspicion and projection come into action and are distinguished in schizophrenia only by the extent to which they can be developed because of shrinking insight, the impairment of constructive thinking, the increasing inability to cope with changing demands, the confusion of remembered fact and remembered thought and the failure to recognize improbabilities and even impossibilities.

In ten patients there was a change from out-going, self-expressive living to withdrawal and self-absorption. The loss of friends and jobs and increasing difficulties in every direction were explained in terms of first an unsympathetic and then a rejecting and hostile environment. There is a tendency to adopt a closed system of ideas which makes no demands on the impaired ability to sustain constant adaptation; many settled for impossible ideas, pleasant justifications which avoided the necessity to plan, running along like toy engines on sets of simple or complex lines. One man moves about on private means while he believes himself to be revolutionizing the bridge world with a new system of bidding, a woman is waiting for the re-establishment of a post which disappeared years ago, another man awaits a revelation and one is founding a league of sanity of which there are never any members, a writer is always about to begin composition and a man and a woman are both waiting for exactly the right kind of job which never arrives.

Opposed to plans there are plenty of wishes, often for work of an ennobling kind. Nine patients expressed the desire to do religious work, two feeling they had a special mission and one wanting to be a sky pilot. Five others wanted to be a surgeon, a doctor, a therapeutic psychologist, a special kind of occupational therapist and a crusading politician respectively. Ten more had facile ideas about the stage, art, the production of ballet, compèring for the B.B.C., organizing "some kind of big business" and others wanted "something really interesting" or "something better" in the vaguest kind of way. Very often there is combined with this kind of wishful thinking the recognition that the new

work must be made simple and easy. The commonest phantasy belief in this series concerned a reciprocated love by a member of the opposite sex (see 'delusions' later), e.g. two men derived interests and emotional satisfaction over years before breakdown from phantasy relationships with idealized real girls, one of whom had never been spoken to, the other having merely acknowledged acquaintanceship.

Projection at first concerned those emotionally nearest and especially the parents, later the family generally, husbands and wives, sometimes the doctor and close friends, then others in the immediate environment, working associates, public officers, near acquaintances, then distant acquaintances and well-known public figures and finally people everywhere. In the early stages God was often felt to have rejected the patient and established religious beliefs were replaced by doubts. Only seventeen patients had no obvious antagonism to either parents, but many had become emotionally indifferent and such hatreds tended to lose their significance and to be replaced by more recent antagonisms. Some sons idolized the father and yet disliked him.

For fifteen patients the immediate environment was hostile but with little active expression, "The matron has me watched", "Why are my belongings disturbed", "It's all this monkey business I can't stand", "People look at me with mixed fear and hate." There is often some bitterness and disgruntlement, three in this series complained to the police and eight others had at some time or another confessed to the police or asked for investigations to be undertaken. As compared with the sensitivity of any anxious patient to the possibility that looks, words, gestures and so on may convey rejection or hostility, there is the factual acceptance that these things are significant so that day to day incidents in the hospital merge into the patient's phantasy.

As the field of projected hostility enlarges, sexual and other thoughts normally suppressed become more and more exposed and there is an increasing failure to appreciate the ridiculous. Blurring of the background of the past against which present experience is seen leads to misinterpretation and false significance moving outside the bounds imposed by normal brain function, thus a homosexually oriented man, continent throughout his life, was pleased to see another patient in his dormitory wearing a surgical corset since he felt that this threw a light on his problem, revealing nothing more however than that "It is so significant".

The increasing inability to know whether something has been said or only thought leads to uncertainty about what is known by others and to assumptions that the doctor or other people are aware of facts known to the patient. At first this may simply concern the patient's age or certain events in his life, but it becomes more and more related to present circumstances, e.g. an out-patient was upset by the assumption that the nurses were aware of a vaginal secretion which she experienced following E.C.T., and this process tends to expand into the well-known condition that "My thoughts are read".

Delusions

Consideration of delusions has been postponed thus far for two reasons. Firstly it is impossible to draw a line between clear-cut delusions, which have been made essential for diagnosis in this series, as against thinking in terms of environmental hostility when insight, clarity and the other faculties already described are defective. Convictions like "My eyes are brought out through my shoulder blades" are clearly delusional, whereas beliefs such as "My husband is constantly planning to leave me" or even "My husband is planning to kill

me and have the house and my things for another woman" obviously cannot be accepted as delusions without other convincing evidence. "I saw a man with one eye and broken, sagging flesh", may have been true but in this case the significance attached, with full belief that he represented a threat of similar disfigurement, was taken as a delusion.

Secondly, during the period covered by this investigation I have studied thirty other patients who, in an apparently clear and normal setting, have become unable to cope with tasks previously handled with ease, whose thinking has been muddled, who find great difficulty in providing relevant facts about their past and who are not depressed except in proportion to the social and working difficulties which beset them. The present series includes exactly similar cases who went on to develop unquestionable delusions and patients are also included in the series who presented the same picture without delusions when there was unequivocal evidence from the previous mental hospital records that delusions had existed. Zucker (1952) has described cases of 'latent' schizophrenia but even more to the point is Eysenck's (1952) conclusion that schizophrenia (and manic-depressive psychosis) forms one extreme of a continuum running from normal, a conclusion based on the analysis of a large battery of objective tests.

Delusions have followed irregularly the pattern of first concerning those most loved, including God, then a wider circle of friends, then well-known public figures and finally people in the vaguest sense. The delusions were sometimes phasic but usually very persistent, accompanied by considerable tensions in early cases, but in the majority the emotion was less than would have been appropriate to the ideas being expressed, in some chronic cases so much less that the delusions were merely remembered when leading questions were asked about them, previous histories being used as guides. Three patients largely confined the hostility experienced to the disease itself by developing a false and immovable conviction that syphilis or cancer was destroying them, but in each of these three cases there was a false belief that people in the immediate environment were insulting them by sniffing at smells or making oblique remarks. As well, roughly in proportion to the severity of the disease, the delusions varied from those only recognizable by confirmatory evidence or further development, to those which were utterly fantastic. When insight is partially destroyed, the patient may project insanity into the environment, five women and two men believed that one or more psychiatrists who had treated them were insane, one man concluded that I was insane and another believed that most psychiatrists and priests were malignantly psychotic.

The commonest delusion of all, affecting twenty-one patients, concerned parents, "I am on a constant wave length with my mother", "My father shared the divinity of God", "She (the mother, then dead) still sucks me dry of every bit of energy", etc. This has been foreshadowed when discussing the loosening of repression.

Among female patients the commonest delusion was of a phantasy love affair. This was present in eighteen and in each it occupied a prominent place in the symptoms of a first or recurrent breakdown; one patient had her third breakdown with such a delusion very much the presenting symptom as it had been twice before, two women believed the wedding date to be fixed. Even when the acuteness of the illness had passed and the patient had levelled out again and seemed more or less recovered, remarks of the kind "Couldn't we arrange a round-table conference?", "Could you telephone him and arrange a car?", "But I must see him to have the matter thrashed out properly", and

"My father must send him a wire, we must have a definite understanding", were spoken or such phrases were written in letters after leaving hospital and the doctor may have been felt to have failed by not co-operating. "Time means nothing to a psychiatrist but I cannot wait twenty years." Another woman developed the delusion that I would have a lover waiting for her at a certain interview and was disillusioned and angry at my failure and she has been more critical and hostile since. Often the 'lovers' seem to be father substitutes and they included four doctors and three priests, "The previous doctor proposed to me", "The doctor made improper suggestions", "He did not say it out but I knew what he meant", "He would not come to the point so I had to leave the parish". Some of the women were already married, but this fact had no influence. Two women had regular and enjoyable sexual intercourse with their husbands but still described phantasy love affairs without shame, although both "knew" and were highly critical of their husbands' unfaithfulness and intent to kill them. Taking the eighteen as a whole the truth varied from the man concerned not having known the patient at all to his having made positive advances without any commitment. In only two male schizophrenics was this kind of delusion present.

In the anxiety group two women had broken down following straightforward love disappointments, and another had been seduced by a married man under the impression that he would leave his wife and get a divorce. One man had left his wife for another woman, but the other woman had gone off with a new man and this had proved intensely traumatic. These were the main findings and compared with four schizophrenics whose illnesses followed real love disappointments and two more whose illnesses came on some months after the deaths of the husbands.

Next in order were delusions concerning the sexual organs, seven women believed that their genitals were drying, rotting, anaesthetic, interfered with at nights and/or affected by inexplicable means, and five men were sure that the penis or testes were dilating, shrinking, twisting or rotting, affected by rays or potions, with or without syphilis or cancer and producing loss of virility. Seven women and four men had delusions concerning animals, e.g. "Anyone walking towards me with a dog causes me to wobble because the dog recognizes my sexual abnormality". Both sexual organs and animals have been mentioned under the 'loosening of repression'.

Delusions of bodily changes were expressed by seven, "My brain is settling into layers", a belief supported by diagrams, "My face, tongue and throat are becoming more and more distorted", in two the brain was rotting and three others had an absolute conviction of a loathsome bodily disease. Four patients expressed their failure at work as a result of fellow workers conspiring against them, four more had day-to-day delusions concerning the immediate environment, the B.B.C. (4), newspapers (3), television (1), were represented and at least seven had delusions of grandeur and were involved in matters of global importance. Several revealed utterly bizarre delusions in the presence of social composure and easy adjustment to a protected environment, "I am the heroine of T. S. Eliot's *Cocktail Party* and I am Lord Byron", and "I have been approached to take a leading part in approaching Mars by rocket".

Duration of Illness before Diagnosis

It is usually difficult to estimate when the illness began, because sometimes several years have elapsed between the first breakdown and the second or third and sometimes it could be argued that the patient had had, say, an hysterical

illness which was nothing to do with the present schizophrenia and I have tried to bear this in mind. Generally speaking, the fuller and more reliable the history, the earlier suggestive symptoms appeared.

The following table is correct as far as I am able to estimate.

TABLE VI

Schizophrenia					Anxiety Patients	
Duration of Symptoms			Diagnosis Known		Duration of Symptoms	Diagnosis Known
Under 1 year	..	..	0	19	1	14
1 to 2 years	..	..	8	8	29	23
2 to 5 years	..	..	12	14	8	15
5 to 10 years	..	..	18	16	11	8
Over 10 years	..	..	23	4	12	1
Average	..	..	7½ y.	3½ y.	5½ y.	2½ y.

There must be added to this that very often peculiarities were clearly present during childhood.

False Diagnosis

In less than a quarter of the patients in this series was schizophrenia the first psychiatric diagnosis. There are good reasons for this, there is not only the reluctance to mention such a serious diagnosis if evidence is only suggestive, but in the absence of severe basic symptoms or of acute episodes the condition may be indistinguishable from a psychoneurotic reaction. Neubauer and Steinert (1952) drew attention to the many schizophrenics thought to be neurotic or schizoid. Moreover, clarity of thought, planning ability, insight, reliability concerning the personal history and the easy recognition of absurdities, are qualities which vary considerably in terms of endowment and since the disease usually involves a slow reduction, this is at first extremely difficult to detect; if the disease becomes arrested it must often pass permanently unrecognized. Sometimes there is a series of different diagnoses over several years, in one case hysteria, then depression, then mania, then recurrent mania and finally schizophrenia; in another patient hysteria, then psychoneurotic depression, then psychotic depression, then schizophrenia; and in a third, psychoneurotic depression, depression, obsessive-compulsive neurosis, depression again and finally schizophrenia. Many patients had had considerable psychotherapy with or without sedation, one patient continually for three years and another for four years, in no way to their detriment as far as I know (see treatment).

TABLE VII

Previous Psychiatric Diagnoses

(These are certain, there were probably more)

Anxiety State or Psychoneurosis	..	..	..	..	..	..	8
Psychoneurotic Reaction	..	..	..	..	..	..	3
Inadequate or Schizoid Psychopath	..	..	..	..	..	..	14
Psychopathic Personality	..	..	..	..	..	..	1
Obsessive-compulsive Psychoneurosis	..	..	..	..	..	..	12
Phobic Reaction	..	..	..	..	..	..	6
Hysteria	..	..	..	..	..	..	19
Depression	..	..	..	..	..	..	13
Hypomania or Mania	..	..	..	..	..	..	6

Anxiety State

Studying the early symptoms in retrospect it is usually clear that anxiety arose out of the basic symptoms. In five cases given this diagnosis the previous personality was not anxious, the personal record and intelligence were good and there were no precipitating factors other than "He took a dislike to a certain master" or "He suddenly got fed up with his job".

The ordinary symptoms of anxiety were present, easy fatigue was noted in 55 patients and under the circumstances of this investigation this is practically 100 per cent. Insomnia was noted in 36, indecision or loss of confidence in 48 and bodily pains, headaches and attachment of fears to possible bodily diseases were all common, while physical changes such as pallor, increased pulse rate, increased perspiration, sugar in the urine and so on were frequent at this time. The anxiety was often mixed with depression, and occasionally additional shyness, withdrawal or apathy had been put down to general inadequacy. The basic changes were often hidden because any acute nervous illness may produce for the time being the same clinical effects.

Judging mainly from those seen in a state of anxiety but to some extent from the histories studied and from relatives' statements, there are certain points which would help to suggest schizophrenia.

1. In addition to the fear already discussed, the patient is both more restless and less expressive (restlessness was a noted symptom in 49 patients in this series).

2. There is a more 'forward-looking' failure, the future may even look terrifying.

3. There is more perplexity and bewilderment.

4. Moodiness and inexplicable bursts of temper and crying are more frequent.

5. If hints are followed up there is more evidence of blame attachment to parental restraint or other interference which is not substantiated on enquiry or of contradictions of a kind which would not continue with an anxiety patient, e.g. "I am gradually getting worse under your treatment", not as a sudden protest but as a prolonged attitude without even the suggestion by word or deed that the relationship should be terminated.

As the disease progresses the anxiety generally lessens and the patient may achieve a remission, always at a level lower than the performance at his best period would indicate and sometimes at a much lower level. Alternatively the anxiety may continue at a bearable level in terms of odd psychosomatic complaints, and given reasonably regular help the patient may go along fairly well for some time. I have been struck in this series by the number of patients who have made satisfactory adjustments for long periods when they are given the opportunity to continue partial dependence on a psychiatrist or a general practitioner.

Obsessive-compulsive Psychoneurosis

The psychoneurotic symptomatology is frequently mixed and here especially anxiety and depression were usually obvious. The standard framework was present, 'A catastrophe involving other human beings is threatened for which I shall be responsible and which will be followed by awful retribution', with guilt and possible aggression. Given a personality with an obsessional loading, there is a natural fit here, the inability to plan and the difficulties of thought are easily exhibited as obsessional indecision and ambivalence and doubts are quickly exposed.

The diagnosis may be impossible at first, but the schizophrenic patients tended to be younger, the attitude 'I know how ridiculous it is' was less marked, there was more compulsive thinking about the frequency with which the patient was brought into contact with tubercular or otherwise infected people and there was an increased tendency to be caught up in ruminations about insanity, syphilis, cancer and bodily distortions and to believe in their existence. The ruminations tended to be more odd, "I am always thinking of the horrible reality that ectoplasm exists", "Do I see what I see, is it really real", "I feel the threat of spectrum analysis, proper light can disappear". Bewilderment and perplexity were more marked. Sargant (1953) has drawn attention to this difficulty in diagnosis.

Phobic Reaction

E.g. A woman who had been an extremely promising girl at her secondary school, head prefect and captain of games, after losing her boy friend to another woman was invalided from the W.A.A.F. at 26 in 1944 with an obsessional conviction that she had a cancer near the heart. Repeated X-rays and investigations followed her into civil life where she settled down to a humdrum job. After a year or two she became attached to another man whom she met as a friend of her brother's, but she developed the fixed idea that he had it in his mind to kill her and she rejected him and was bitterly disappointed with her family when they continued to be friendly with him. It is easy enough here to see the symbolic cancer and the identification of love with the threat of death, but she continued to make no progress whatsoever in her working life, in fact her ability to obtain junior posts suffered increasing interference by ideas of environmental hostility. Not until 1955, when she was 37, did other delusions become obvious, although it became clear then that they had been developing for a long time.

Hysteria

The theme 'I am unfairly neglected and unloved' develops into active symptomatology which is indistinguishable at first from that seen in hysteria, and one met not only day-to-day manifestations but special syndromes like fugue and amnesia, of which there were two examples in this series. As with hysteria proper, fears may be successfully resolved by the illness or the underlying anxiety may be plain. The shifting of phantasy towards belief is common to both but in schizophrenia the ability to recognize the ridiculous is less and the changes are more widespread, rapid and permanent. In this series the diagnosis was most frequently made following the exhibition of impulsive conduct, flightiness, the engineering of scenes and crises, the throwing up of jobs and general histrionic behaviour with covert aggression. The most common missing item was any recognizable aim other than the general demand for attention and the infliction of punishment on the environment. Prolonged dramatic silences are twice recorded but these may have been derived directly from the basic symptoms. In schizophrenics the remark so often heard from hysterics, "I cannot concentrate or think" may prove eventually to have a factual significance.

Where the hysterical pattern was preserved, sooner or later conduct became inexplicable in terms of hysteria, there were impulsive attacks upon strangers, unexpected and embarrassing declarations of love, imperious or threatening demands upon the police, clergy, doctors and so forth, patients suddenly walked naked into the night or made suicidal attempts. Ziegler and

Paul (1954) followed up 66 hysterics diagnosed at the Boston Psychopathic Hospital and found 22 psychotic, of whom 12 were schizophrenics.

Dramatic symptoms which could have brought up the question of hysteria appeared in the histories of 40 patients; about two-thirds of the series were more than averagely sorry for themselves during the period of observation.

Depression

Two kinds of depression occurred, a reaction to the basic symptoms and a manic-depressive swing.

The patients were typically depressed, slow and inactive. Suicidal attempts or gestures had been made by nine, and three more were suicidal enough while under my observation to make me anxious on this point. Among the non-schizophrenic anxiety patients only one man and one woman had made suicidal gestures. Talk of suicide and death was extremely common not only among depressed schizophrenics, but generally in the whole group.

The points of difference noted were more sensitiveness and withdrawal from the environment, and some showed a demanding, dramatic quality. Loss of appetite was less common. There was also more surprise and fear associated with the ideas of death than in true depression, with at the same time a clinical feeling that the patient was more apathetic about it, "Death to a cancer case can be a blessing, why shouldn't it be for me". The depression was more often mixed with a desire to do good, a naïve compensation for feelings of guilt, in the fields of religion, medicine, nursing or a vague 'something'. This was noted in other reactions as well and so was the possibility of clearing or smouldering spasmodically.

Mania

The typical syndrome of elation, flight and psychomotor activity coming as an explosive rejection of the incapacity, occasionally with a great increase in sexual activity. Depression alternated twice.

Depersonalization

This symptom was commoner if one sought for it specifically. It was marked in six and was the presenting symptom in two.

Fits

Two patients, one of whom had a strong family history of epilepsy, had had fits.

Alcoholism

Two patients with marked anxiety and depressive symptoms had been treated for alcoholism. Three patients expressed strong fears of taking alcohol because of the danger of losing control.

It will be clear that the diagnosis of schizophrenia is usually missed at first and I think that milder forms of the disease are much commoner than is suspected and that the diagnosis is sometimes dropped unjustifiably, e.g. a patient of 40 who had twice previously been in a mental hospital with a diagnosis of schizophrenia arrived at St. Ann's with a psychiatric description 'There is no present evidence of her previous psychosis and her physical condition is satisfactory, but she is very neurotic', although the patient had weird delusions and incapacitating thought disorder, to say nothing of severe ulcerative colitis.

WHERE IS THE LESION?

It is difficult to imagine that the basic symptomatology is not organically determined. There are several in this series who enjoyed happy childhood homes, who grew up in healthy surroundings with every prospect of satisfaction and success, who were out-going, active and competent, virile and well-formed or gay and lovely to look at, until they were struck by this disease of devastation and became people tortured and terrified by a brain that would not do its job, that distorted their reasoning and falsified their memories, and who were only saved the agony of deterioration by a merciful reduction in the depth of emotion and by the failure of insight. The fact that legal definitions and legalized control have occupied such a prominent place in the history of schizophrenia has tended to make the diagnosis dependent on evidence of 'Insanity', even among those who are clearly aware that these legal requirements should have no direct bearing on the picture of the disease. It is as if special and painful seclusion was necessary for any sufferer from tuberculosis whose disease was 'open' as recognized by, say, the spitting of blood, with a consequent reluctance to make the diagnosis in its absence.

This position has been accentuated by the acute phases when hallucinations are so common together with clouding and extraordinary behaviour, as well as by the fact that so many schizophrenics suffer for years from persistent hallucinations which would be distracting to anyone and which cannot be contained in association with a working life by a patient with the basic defects.

The present series of cases has the advantage that treatment did not involve even the signing of a voluntary form and that both the persistently and disturbingly hallucinated and those suffering acute phases were absent, although the majority had suffered acute phases during the course of their illnesses, so that one is really examining the schizophrenic 'cures' who are showing residual or new symptoms together with very early cases in whom at first the diagnosis is in doubt.

Of the basic symptoms, the failure of planning stands out because it is such an accepted symptom of frontal defect (Penfield and Evans, 1935). Penfield and Jasper (1954) state that stimulation of the frontal lobes does not produce the dramatic evidence of function revealed by stimulation of the temporal lobes, but the fleeting distortion of planned initiative in a patient on an operating table would hardly be expected to do so, although the same patient would soon run into trouble during the ordinary business of life if his planned initiative was distorted and his 'understanding of the future consequences of present action' was seriously at fault (see Penfield and Jasper, 1954, quoting Denny-Brown). Besides, Penfield and Rasmussen (1950) never produced speech by direct stimulation anywhere, and words are the symbols of ideas; moreover this extraordinary silence follows stimulation of parts of the brain the bold cutting of which has had to be stopped in psychoneuroses because of the devastation of character which follows, although they can still be heavily incised with impunity in advanced schizophrenics. Again, Penfield (1952a) says that the temporal cortex is obviously necessary for the interpretation of current experience, since minor temporal seizures may produce misinterpretation, but he does not add the equally obvious possibility that the frontal cortex may be hard put to interpret abnormal discharges in the temporal lobes.

Again it was impossible not to be struck in this series by the general progress towards a lack of normal restraint, with easy discussion of sexual matters, a lack of consideration for others, rudeness, greediness, selfish demands and the absence of effective self-criticism, all of which are so typical of the more severe

sequelae of prefrontal leucotomy. This is camouflaged to some extent, first of all forms by the fact that every degree of disease is possible and that sometimes an acute and severe illness ends in what is tantamount to a complete recovery, and secondly by the possibility strongly suggested here that many schizophrenics are superior people to begin with. In many of them good qualities endured in an extraordinary manner. The opposite is true as well; a devoted mother said of her daughter "She was never popular with her brothers and sisters, she always took it for granted that she must have everything her own way" and this is by no means unusual. One schizophrenic mother actually inducted her fifteen-year-old daughter into taking increasing doses of sodium amytal. Again, the release of unconscious hostilities against the parents is evidence not only of such unconscious hostilities but of a failure on the part of patients to weigh their feelings against their obligations and the total situation. Uninhibited spitefulness was much more frequent than among anxiety patients; it was shown against the parents five times, against the married partner seven times, against other members of the family four times and five times against fellow patients. As well, there was indifference to the suffering of others, especially of parents in the face of the patient's illness, in 24 patients who were clear-minded within their limits and reasonably socialized. Lying and cheating at games were observed during the early stages but insufficiently for figures to be of any value, and in general schizophrenic patients tended to *lose the ability* to lie: chronic cases were extraordinarily truthful if allowances were made for their delusions. Nine schizophrenic patients had abandoned or changed their religious faiths, excluding 15 whose early agonies had engendered doubts, several switched about from this cult to that, and the majority was indifferent to any religious appeal, although a few chronic patients, were helped considerably by simple, unquestioning faith.

The distinctive deterioration associated with extensive loss of frontal lobe function has been known for nearly a century. It was described by Ferrier in 1878 (see Russell, 1948), underwritten by Hughlings Jackson (1884), stressed again by Bianchi (1922), by Gordon Holmes (1931) and more and more frequently as time went on, by Brickner and Tilney (1936), by Halstead (1947), by Ackerly and Benton, Rylander, Yacorzynski *et al.* in 1948 and by many others, while the description of the effects of severe bilateral frontal lobe damage given by Martin and Elkington in Price's Text-Book of Medicine (1946) could hardly be bettered as a picture of the more deteriorated schizophrenics. There is a fading-out of the sense of adult responsibility, impoverishment of thought, an inability to plan the use of retained knowledge, emotional flattening and loss of drive, accompanied by a failure of insight. But havoc arising from '... la fragilité bien connue du cerveau préfrontal, tard venu dans la phylogénèse', to quote Messimy (1953), or from a more freely accepted pathology, in the absence of reflex changes, is missed repeatedly, as Klages (1954 and 1955) and Faust (1955) have shown. It is suggested that the same clinical picture is standard in chronic schizophrenia, with additions which will be mentioned.

Money sense was defective in 19, sometimes chaotically so, and the sense of any need for punctuality (or the time-sense) was reduced in another 17. Every anxiety patient was conscious of the changing picture wrought by the passage of time, but many schizophrenic patients were quite unaware of the problems raised by long absence from active existence. I would judge that twenty-nine patients had less than the average sense of humour and this defect was much more marked than in anxiety cases. A few had preserved a macabre sense of humour with little sense of fun. The well-known 'witzelsucht' occurred

in five, e.g. "... poor fellow in Wormwood Scrubs, Shepherd's Bush, I hope he will find his shepherd under the 'bush' before the worms scrub him out", "I am a lun-atic, striving for the moon—lune in the top room—attic", "His name is Playfair, some call him Play Foul, one could have Foul Play ending up with Fowl Pest". With the pathology of Pick's disease in mind, this series showed several examples suggesting a progressive failure in the command of words without any impairment of the mechanism of speech, exhibiting examples like those described by Petrie (1952) after prefrontal leucotomy. In many advanced cases in mental hospitals this has progressed to jargon aphasia, but it is called 'word salad'.

The view that the frontal lobes are at least part of the areas diseased in schizophrenia receives strong support from the effects of leucotomy, especially in those with few hallucinations and of good basic ability. Some of the most striking improvements I have seen have followed posterior leucotomy and this becomes understandable if one supposes that remaining healthy brain has improved its performance. The most extensive prefrontal operations produce no change in very deteriorated schizophrenics and I can report that in mental hospital wards for the most chronic patients the leucotomized cannot be distinguished from their fellows. Couston (1954) describes a group of mental defectives as being just like leucotomized mental hospital patients.

Gellhorn's extensive work (1953) makes it a reasonable proposition that in schizophrenia the lateral and posterior hypothalamus is either affected as part of the disease or is disordered by the disease. The lateral and posterior nuclei have developed throughout the mammalian series *pari passu* with the neocortex both reaching the highest development in man (Le Gros Clark *et al.*, 1938), and there is nothing more human than the depth and range of emotional response (Hoskins, 1946). But the extraordinary emotional shallowness seen in schizophrenia is not essential for the diagnosis and may be deceptive; to take one example from this series, the same woman who discusses deserting her husband and children for the love of a young fellow who is hardly aware of her existence craves and enjoys sexual intercourse and can become bitterly hostile and angry; it is not her emotional responses which are at fault but their depth and range and linkage to a humanly adult level of integration. Patients who become almost unbelievably superficial may be in no way aloof or withdrawn and may chatter easily and be socially short of inhibitions; this could be said of at least nine patients in this series and four had changed from quiet, reticent people to out-going and boastful ones.

The most convincing evidence of hypothalamic dysfunction in schizophrenia is provided by the intense, uncontrollable emotional eruptions which characterize the early phases, so different from the mere lack of emotional control sometimes seen after prefrontal leucotomy. The subsequent emotional flattening *could* be visualized in terms of the failure of frontal function, but I favour the view that in part it is the result of hypothalamic failure. It should be noted that this series is very short of catatonics, the type of schizophrenics in whom one would expect the most severe damage to the hypothalamus.

Even remembering the total integration of brain function, there is a special intimacy between the frontal lobes and the hypothalamus (Le Gros Clark, 1938; Bailey and Sweet, 1940; Delay, 1947; Ward and McCulloch, 1947; Clark, 1948); in hypoglycaemia these two parts of the brain are the first to show evidence of dysfunction (Parfitt, 1937) and of course prefrontal leucotomy produces considerable vegetative changes (Rinkel *et al.*, 1947; Fulton, 1951). Dysfunction in the hypothalamus is very unlikely to be the sole cause of schizo-

phrenia in view of the variety of gross and even fatal diseases which can develop there without producing clinical pictures even faintly resembling schizophrenia (Le Gros Clark *et al.*, 1938; Wechsler, 1953), but a degree of dysfunction is likely and would go far to explain (see Harris, 1955) the almost uniform glandular functional abnormalities reported in schizophrenics side by side with repeated reports of glandular normality. Regarding glandular diseases, again they can be of such variety and malignancy without producing anything like schizophrenia (e.g. the pituitary, and almost every other gland, can even be destroyed totally provided substitutive therapy is devised), that the essential pathological processes can hardly lie among them, although they may share in the generalized biological substandard which may characterize at least the more severe forms of schizophrenia.

Penfield and Jasper (1954) mention hallucinatory experiences many of which are typically 'schizophrenic' except that they are easily described by the patient, episodic, associated with epileptic foci in the temporal lobes and with recognizable epileptic phenomena, reproducible by stimulation and relieved by appropriate excisions. Penfield and Jasper look upon the temporal lobes as store-houses of rememberable experience. The diagnosis of schizophrenia is not suggested by the total clinical picture they describe, there are schizophrenic symptoms without psychosis. Hallucinations may not occur in schizophrenia and in the form of intense sensory phenomena are often of short duration, leaving only memories. Once more heightened abnormal activity followed by loss of function is suggested.

A search through Critchley's monograph (1953) reveals few symptoms characteristic of schizophrenia which could be attributed to the parietal lobes, although Hanfmann (1939) described a reduction in the comprehension of spatial relationships.

The clinical evidence suggests that large areas of the frontal and temporal lobes and something of the parietal lobes together with the posterior hypothalamus are affected in schizophrenia. (I favour the view that actual dysfunction as apart from failure of function in the frontal lobes is an essential element in any psychosis. Subtract from the clinical picture of general paralysis or Huntington's chorea all those signs and symptoms for which an explanation can be given in terms of local brain pathology, including Penfield and Jasper's temporal lobe effects, and you are left with something very like paraphrenia. This is diagnosis by exclusion, but it supports the importance of disordered frontal lobe function in schizophrenia.) Symonds (1931) pointed out that mental symptoms occur in the early stages of lesions in the 'silent' areas, and Miskolczy (1938) suggested that those areas of the brain are affected in schizophrenia which are particularly human, and described changes most marked in the prefrontal and inferior temporal areas. Von Bonin (1952) stressed the parallelism in the development of frontal and temporal lobes in primates and the astounding homogeneity of the cerebral cortex of man, certain well-known areas excepted, so that one has to view cerebral localization against the holistic possibilities demonstrated by Lashley (1929) and supported strongly in this country by Golla; intelligence in its widest sense is a function of the whole cortex, if not of the whole brain and, as Halstead (1947) has pointed out, at most can only have its maximal representation in the frontal lobes, even loss of insight concerning loss of function is found after brain damage further back (Critchley, 1953).

Rose (1927), Papez (1937), Grünthal (1947), MacLean (1949 and 1954), Le Gros Clark and Meyer (1950), Gastaut (1953), and Meyer and Beck (1955)

among others have developed the knowledge of the importance of the hippocampus in human brain function and of the associated circuits connecting the frontal and temporal lobes with numerous other smaller brain parts, including the hypothalamus and thereby involving the autonomic nervous system and the ductless glands, especially in relation to emotional expression, including sexuality. The integrity of the hippocampus is essential to the highest forms of intellectual performance, but the clinical evidence linked with the pathology of the hippocampus does not call schizophrenic phenomena to mind.

In fact, however advanced and chronic schizophrenia may be, large areas of the brain continue to work very well: a deteriorated schizophrenic can put up on occasion an outstanding physical performance involving exact sensory discrimination and including the immediate interpretation of special sense stimuli, his reflexes are normal, there is no tremor, rigidity or involuntary movement, no hypotonia or loss of equilibrium, he makes no errors of range or direction, he is oriented in immediate space and time, has constancy of sense perception and perception of movement, he eats, drinks, sleeps and can be stimulated sexually. Furthermore he may have a fair measurable intelligence and a well-stocked memory. He wakes easily and can become alert enough to those matters which retain his interest, so that it is difficult to implicate the thalamus, necessary though this is to a properly functioning prefrontal cortex (Cairns, 1952), the ascending reticular activating system (Moruzzi and Magoun, 1949; Magoun, 1952) or Penfield's centrencephalic mechanism (1952a). To quote Penfield, '... lesions, however large, which are restricted to the cerebral cortex do not abolish consciousness, although they may modify its content'. Schizophrenia is a disease which does not abolish consciousness but which modifies its content. Turner (1955) has written on these matters and ends by looking towards the frontal lobes. In fact it is difficult to better Miskolczy's concept of schizophrenia as a disease of those areas of the brain cortex which are particularly human, to which I would add the posterior hypothalamus, a concept which explains why schizophrenia is not found in very young children (Schurmans, 1952) before they have begun to leave the chimpanzee behind in the direction of human supremacy (Katz, 1937).

WHAT IS THE LESION?

There is no present answer to this question, but valid reflections are possible. The following table shows how heavily the schizophrenic families were loaded with psychosis as compared with the anxiety states.

TABLE VIII

						Schizophrenia	Anxiety
Psychotic mothers	..	..	..	..	..	6	2
Psychotic fathers	..	..	..	..	..	10	0
Psychotic siblings	..	..	..	..	..	14	1
Psychotic others (children, uncles, aunts, grand-parents, and cousins)	..	..	..	..	..	17	3
						47	6
And schizoid brothers and sisters	..	..	..			6	0

The significance is overwhelming, and a genetic factor or factors can hardly be doubted (Kallmann, 1938). In 1953 Kallmann published evidence suggesting that identical twin homosexuality concordance was almost 100 per

cent (44 of 45, the exception being a schizophrenic exhibiting homosexuality and alcoholism), whereas the identical twin concordance for schizophrenics is less than 86 per cent. (Garrison, 1947), a high figure but one indication that postnatal factors have importance.

TABLE IX

	Schizophrenia	Anxiety
Psychoneurotic mothers	4	6
Psychoneurotic fathers	5	5
Psychoneurotic siblings	1	5
Alcoholic parents	1	8
Parents with psychosomatic complaints	2	13
Mother unusually dominant	2	6
Mothers with unusually violent tempers	4	2
Mothers oddly cold	5	2
Fathers oddly cold	9	2

N.B.—“psychosomatic” complaints include hyperthyroidism, hyperpiesis, peptic ulcer, asthma, migraine, rheumatoid arthritis.

Only the general picture in this table is significant, with a suggested accent on emotional extremes and particularly emotional flattening in schizophrenic parents. Thirty-six mothers of schizophrenic patients provided no evidence of personal abnormality whatsoever and many were models of understanding and affection. From the evidence I have been able to gather, the conception of schizophrenia in terms of maternal rejection appears quite unwarranted and this supports a more detailed enquiry on this point made by Nielsen (1954), a paper by Anderson (1952) who was forced by her experiences with schizophrenic children to reject the ‘guilty mother’ theory and find for an organic defect, and a paper by Oltmann *et al.* (1952).

INFANCY AND CHILDHOOD

TABLE X

	Schizophrenia	Anxiety
Maternal pregnancy troubles (1 premature, 1 toxic)	2	0
Patient ‘highly strung’ or nervous as a child ..	9	10
Physiological irritability more than average. (Bed wetting, stammering, nail biting, etc.)	12	9
Patient ‘inadequate’ from infancy	8	8
Infantile stress and deprivation	31	27
Patient considered ‘odd’	14	0
Only child	18	18

Infantile stresses and deprivations include parental inadequacy, abnormality, cruelty, separation or desertion, serious disorder or death of one or the other, children brought up away from home, intense hostility in the family, illegitimacy, etc.

‘Oddity’ was confined to the schizophrenic group and would seem to represent strong evidence of some constitutional defect, since several parents of the children in this group were of excellent quality and understanding and some of the children in their adult years were clearly aware that as children they had been unable to share the warmth of family affection which was available to them. Some descriptive phrases which characterized such children were ‘She never wanted to be kissed like her sister’, ‘The most exciting things would happen but she was not interested’, ‘He was so cruel to his baby brother but

he simply could not understand', 'She was never happy like other children', 'Even when his sister died he hardly seemed to know', 'She never made friends', 'She was always different and odd', 'I never knew how to treat her, she was so cold and yet so hurt'. The more reliable and detailed the childhood history the more likely was one to find a difference from normal of this kind. Lauretta Bender has been developing her views of a disorder of maturation at embryonic level, a kind of genetic encephalopathy, over some years (1952, 1954, and see Hendrickson, 1952) but I cannot support her views concerning the crisis of birth and later tension-situations.

The childhood oddity and emotional coolness, where it existed, often led to an unhappy school career which was suffered rather than enjoyed, although unhappy school years were equally common in anxiety patients. Commoner in schizophrenic histories were school incidents, e.g. refusal to sit examinations or the development of faints before them, which occurred in six as compared with none of the anxiety patients. Nielsen's schizophrenics showed less than average ability at school and made fewer friends and this series confirms the latter point. Some schizophrenics were aware of and felt somewhat guilty about their lack of affection for parents, "I felt I should love my mother more, I wanted to and couldn't" but others were unaware of the perplexity and unhappiness produced by their peculiarities.

Preliminary Brilliance

Of all the findings in this investigation I have been most struck by the period of exceptional brilliance which developed so often during adolescence, particularly since I came to this enquiry with the knowledge that years ago schizophrenia had been thought often to affect the brilliant and gifted but that intelligence tests had shown this to be a false impression. There is some evidence that a similar phase sometimes occurred during childhood, not only in that schizophrenic children were often unusually imaginative, 'Not half of what she says has ever been true', 'I have never known when to believe her' and so on, but also in that several of them were unusually precocious and this phenomenon was confined to the schizophrenic group. Three children were spontaneously described as having been unusually gifted with their hands and they were all schizophrenics. However, it was difficult to demonstrate such occurrences with certainty but there is no doubt whatsoever that during adolescence and early adulthood a period of heightened and unusual ability developed in at least fifteen of the schizophrenics being studied.

Although only fourteen schizophrenics could be described as having had no unusual features in their histories before evidence of mental illness developed, nevertheless thirty-one could be described as having been at least averagely out-going and social before the illness was suspected as compared with only seventeen anxiety patients, and some were gay, confident and capable to a degree not met with at all in the anxiety group, moreover a few carried far into the disease a personality exhibiting bonhomie and social grace quite distinct from the uninhibited brashness of many chronic patients. On the other hand twenty-seven schizophrenics were described as shy with the opposite sex compared with sixteen anxiety patients and the information was volunteered about sixteen schizophrenics that they had been moody and seclusive but this was said of none of the anxiety patients, although this may be partly explained by the disease itself.

The patients who exhibited the brilliance being described began to forge ahead often in the most unexpected way, especially in studies, although there

were occasional special subject gaps, and often in games as well, for instance altogether nineteen of the schizophrenic patients had been unquestionably better than the average at school games compared with seven anxiety patients. But this rocket progress from obscurity, reaching a spreading cascade of brilliance, dissolved again into the shadows.

The bright period was commonest during the years covered by the first year in the sixth form to the second year at the university; ten schizophrenics had spectacular school careers compared with one anxiety patient, an insecure homosexual; then the grandiloquent certainties of the sixth form concerning religion, politics and economics would suddenly become perplexing, or later the exciting exploration and discussions at the university would become a confusing experience from which the patient had to withdraw. "The whole business is stupid and I refuse to go on."

The schizophrenics included two girls who won scholarships to Oxford, although one never reached the University, one man who won a Cambridge scholarship and another a London University scholarship after an extraordinary school career; but the others were equally striking in different ways: for instance one whose school report included 'He writes Latin even more freely than he does English', and who seemed certain of a classical scholarship, began to crumble unaccountably during the last year or so at school. Another with a brilliant school record at work and play gained a commission during his National Service, but returned to increasing bewilderment as a failing student before levelling out at an altogether lower level of achievement. Of the fifteen, six were only children, five had one sib and four two, none of the thirty parents or the thirteen sibs had ever stood out in anything like the same way. The anxiety group had only one Oxford scholarship (the man mentioned above) to put against this preponderance. Seven schizophrenics had exceptional talent in the fields of music, painting, sculpture, etc., compared, with only one in the anxiety group. Fitzherbert (1955) has recently reported three schizophrenics whose illnesses began with a surprising increase in measured intelligence and I can add my conviction that this is by no means a rare phenomenon.

The physical appearance of the favoured schizophrenics matched their intellectual superiority. I had the names of all the schizophrenics (thus diluting the physical attraction under consideration) and of all the anxiety patients typed on separate sheets of paper marked A and B and I handed the two lists to a Sister who had known most of them and asked her to take them away and mark the group which, if she found them at a dance or met them on some social occasion she would feel were the more gay and attractive. Her opinion was decisive in favour of the schizophrenics, but she added that some of the other patients were better fun, some of them used to 'keep their dormitories in fits', thus making a voluntary comment on another schizophrenic defect. More schizophrenics started careers in the fields of service to others, religion, medicine, nursing and so on.

Many of the brilliant schizophrenics went on to a full psychosis (i.e. became long-term mental hospital patients), six levelled out below the mediocre. It is a tragic experience to see someone lively and attractive just missing a human peak and falling away to become a coarser person in almost every sense of the word.

The intellectual facilitation is reminiscent of the extreme acuity of hearing and of vision, including a heightened appreciation of brilliance of colour which I have previously observed for a period in schizophrenics both in the natural

course of the malady and while recovering from insulin comas; I have met this also in normal people recovering from anaesthetics and in atropine poisoning (Parfitt, 1947), and of course it is a feature of mescaline and other intoxications. It has also been suggested earlier in this paper that there is evidence of intense overactivity in the hypothalamus before emotional flattening develops.

This brings one to the question 'Why are the dramatic symptoms of schizophrenia so rare in diseases of various kinds affecting the brain areas which it is being suggested are failing in schizophrenia?' It is now suggested further that not only is the extent of brain affected unusually extensive (and at the same time peculiarly limited), but that the disease first facilitates brain function sometimes to an extraordinary degree, and that between this facilitation and the eventual abrogation of function there is a period of widely varying duration when there is *dysfunction*, a dysfunction which I can only compare with the paraesthesiae which lie between hypersensitivity and anaesthesia.

Recently I drew attention again (Parfitt, 1955) to the dramatic clinical crises which occasionally developed during the deep insulin treatment of schizophrenia and which are truly remarkable, even inexplicable, unless seen against some such background as is being painted here. The two outstanding facts are firstly that the 'irreversible' coma develops when the greatest care is being taken to avoid this very development and almost uniformly as a sequel to the first or an early coma when this state is merely allowed to be reached before being terminated; and secondly that in proportion to the duration of the 'irreversible' coma and the mindlessness which follows, so will the eventual result be best. The young lady described in the paper to which reference has just been made (Parfitt, 1955, Case 2) who hung between life and death for several days and who then improved at first to a state of painful dementia which gradually gave way to a state in which she was able to become independent, has, since that paper was published, doubled her income and filled in her holidays with extra work (not under my advice) besides improving in every way, although never reaching the fullness of her youthful promise. It is difficult to interpret these events, spread over several years, except by the hypothesis that during the development of the schizophrenic process there is a period of extreme sensitivity in certain brain areas and that if these areas become totally inactive then the remaining tissue can begin to expand its functions in a steadily progressive way.

Adult Stresses

TABLE XI

	Schizophrenics	Anxiety
Domestic 'hate'	8	23
Patient doing two jobs	1	9
Psychosomatic illnesses. (Ulcers, allergies, some skin diseases, ulcerative colitis, rheumatoid arthritis.)	6	16
Tuberculosis in the history	3	1
Traumata (serious operations, wounds, injuries, unusual war stress)	4	10
The patient's own frigidity (but many more anxiety patients were married)	4	8
Care of 'mental' or difficult relative	4	6
Love losses (deaths of married partners or children, desertion, genuine disappointments)	14	4

I think there is a tendency to over-stress 'stress'; it is almost always possible to find in any patient's story a rationale for the breakdown, but there is here this

difference that one never failed to make out a story for the anxiety patient whereas in nine schizophrenics the illness seemed beyond understanding whatever weight one was prepared to put on causes. In any case, the precipitating and contributing stresses are greater in the anxiety group, excluding personal 'love' losses. With every kind of patient stresses arise out of the nature of the illness itself, but this was outstandingly so with early schizophrenics. Massive adjustments to war (Hemphill, 1941) increase psychoneurotic reactions but not schizophrenia; a quiet simple culture, stressing filial piety and traditionally opposed to alcohol, has less psychoneurosis, alcoholism and psychopathy but not less schizophrenia (Tsung-Yi, 1953). Rheumatoid arthritis (Pilkington, 1955) and other 'stress' diseases are rare in chronic schizophrenics for fairly obvious reasons.

Chemical Toxins

Much has been written of a possible chemical causation in line with the very schizophrenic-like symptoms produced by mescaline, L.S.D., atropine, etc., and particularly adrenochrome as a possible abnormal body product, or rather as a normal body product which may exist in larger doses than normal. But if these are important, and well they may be, one still has to explain why the brain effects are so extraordinarily limited. Without exception, as far as I know, these poisons, like anoxia, produce not only more intense 'temporal' hallucinosis, and perhaps 'occipital', etc., than is usually found in schizophrenia, but also muscular inco-ordination, giddiness, severe malaise and other evidence of generalized effects, so that the greatest care has to be taken with dosage. Such toxins produce increased effects in acute schizophrenics but considerably less in chronic patients as compared with normals, a further fact supporting the view of heightened followed by diminished sensitivity.

Other Considerations

Miskolczy (1938), much helped by the work of Schaffer, with whom he wrote a joint book, described a necrobiotic process in schizophrenia in the frontal and temporal lobes particularly, especially the prefrontal and inferior temporal portions, and involving chiefly the third and fifth cortical layers with less damage in the sixth, second and fourth. Since I became aware of his work only after I had felt on clinical grounds that this was the distribution of the changes I have naturally been impressed by his findings although they have not been confirmed. Hoskins (1946) describes many possible defects in body structures, the most convincing of which are perhaps the vascular and capillary abnormalities demonstrated by Olkon (1939) and Pickworth (1952). Adrian (1954) and Murray (1954) make clear that brain pathology can be devastating in the absence of microscopically demonstrable pathology, and subtle biochemical and electrical changes may elude detection for a very long time to come, especially if the disease is a biological variant, as Eysenck's work suggests; his analysis throws up the possibility that the disease can develop when a hereditary combination which is an advance on both parents just fails to hold and involves the vulnerability which leads to catastrophe, either inevitably or because of extraneous factors not yet known; they could include even organismal invasion of the kind described by Papez (1952) or some other variety.

Von Bonin (1952) is sceptical about any kind of computing machine analogy, but the disease does give the clinical impression of a brain constantly trying to right itself at a lower level of performance in a manner analogous to a

disordered cybernetic system (Wiener, 1948; Ashby, 1954) which goes on cutting out part after part until a state of equilibrium is reached.

Treatment

In the complete absence of a method of reversing the unknown process it may still be possible to find a safe way of imitating the effects of 'irreversible' coma (Parfitt, 1956). Until then supportive psychotherapy consistently offered by the same psychiatrist, preferably one who believes that arrest of the disorder may occur at any stage and be followed by holistic improvement, is the most valuable form of treatment that can be made available to a schizophrenic at present (Mann, 1953; Bak *et al.* in the symposium in the *International Journal of Psychoanalysis*, 1954). The very long-term prospects are better than with many chronic brain degenerations, disseminated sclerosis for example, and it is a medical tragedy that humanity largely shrugs its shoulders at the tremendous possibilities of rehabilitation if observation and therapeutic help are never abandoned. Interest and medical confidence help any patient, of course, and the availability of someone who can discuss with acceptance and understanding family relationships and sexual developments in the exposed terms revealed to the patient will often tide the patient over until a remission occurs. It is justifiable to make repetitive reassurances and explanations as authoritative as the situation allows. The fact that thoughts can become beliefs means that a patient convinced of improvement at interviews can become certain that it has occurred.

Nineteen patients had had prolonged psychotherapy without a diagnosis, and on the whole the results seemed to me to have been good. The frequency with which this occurs makes it clear that large numbers of schizophrenics who have never had an acute episode are in fact being successfully kept going by psychotherapy until natural remissions occur. At the time of writing it remains the main form of treatment which is helping 45 of the patients to live away from hospital.

It is often possible to hold the patient to a reality situation by explanations which are simple and satisfying and which contain obvious truths, e.g. that the death of the mother, where this is so, has stirred up resentment against the father, that he had been more dependent on his mother than he realized, and that with worry about his health a kind of vicious circle had developed which had impaired his energy and his confidence, but that he must now begin to expand his active interests. Sometimes this can be carried on until there is a degree of stabilization, always at a lower level of potential achievement.

During acute phases especially it should be remembered that a child first learns to detect kindness and affection in the inflection of a voice and there is good reason to believe that this early response is still operative in states of severe confusion so that 'mothering' when genuine is invaluable. The patient's need for the equivalent of parental help is almost infantile. Three of the men in this series were completely uninterested in girls sexually, they longed only for mothering.

The fact that the disease process often becomes arrested at a level compatible with a social and working existence, and that psychotherapy in the form of understanding, affection and help is the most important and necessary form of treatment and is so often rewarding, has tended to blind many to the underlying failure of brain function which may possibly resolve but which is usually replaced by the quietude of partial loss. The greatest hope for the schizophrenic is that once mal-functioning tissue has ceased to function, then re-organization

and clinical improvement is possible, and this is the keystone of the attitude to the schizophrenic, that those who watch and wait are ever ready to help the natural process which could improve the performance of the victims in whom the disease has become arrested (see Neubauer and Steinert and many others concerning the recuperative potentiality of schizophrenics).

The rapport established makes physical treatments possible should they be indicated. A large proportion in this series have had periods in mental hospitals and usually intensive physical treatments which at least continue a doctor-patient relationship and encourage a justifiable attitude that improvement is possible.

Sedatives are absolutely necessary sometimes, and especially with manic-depressive attacks during schizophrenia if E.C.T. fails to help quickly, and prolonged narcosis is very useful. Eleven patients in this series had had a narcosis or modified narcosis, one of them twice and one of them three times. Largactil particularly and sometimes reserpine and sometimes both together seem to be genuinely helpful on occasions. If the disease tends towards stabilization with residual defect it would be expected that sedatives would become unnecessary, and this expectation has been illustrated by the present series, in contrast with the anxiety states. Drugs which may control hallucinosis are being tried (Fabling, 1955, etc.) and symptom control, as in epilepsy, may go a long way yet.

I have not been impressed with E.C.T. in early cases but in milder chronic forms, properly spaced, it acts as if a slowly spreading abnormality was repeatedly righted (Parfitt, 1942; Bourne, 1954). On one occasion in this series it appeared to break the patient's precarious hold on reality and precipitate an acute episode. Sometimes it helps insomnia and indirectly improves the general condition.

Excepting the extraordinary value of 'irreversible' comas, the chief value of an insulin unit is the socialization and camaraderie induced in a common severe experience as well as the fact that close attention is given to the patient while stabilization is being achieved so that rehabilitation follows naturally and more quickly (Gillman and Parfitt, 1938). As pointed out by Freyhan (1955) almost as big a proportion of schizophrenics become chronic as in Bleuler's time, but the discharge rate from mental hospitals is higher and more schizophrenics are being kept going in the community.

Thirty-eight patients in this series had had insulin coma treatment, mainly at Holloway Sanatorium. One patient had died during a second course elsewhere.

Occasionally patients who have become unemployable but have residual talents, or acutely disturbed patients of long standing in whom it is felt that there are still elements of a good personality and measurable intelligence and who are worried by few if any genuine hallucinations, can be improved by leucotomy. Two patients in this series went on to leucotomy, in both cases with good effect and I have seen many other extremely satisfactory results in such cases. Physical treatments however are to be viewed like the operative procedures in tuberculosis, and consistent supportive psychotherapy is the basis of treatment for schizophrenia, just as rest and guided living are the essential provisions for tuberculosis.

SYNOPSIS

The paper presents a detailed analysis of 61 schizophrenics studied in an open hospital for the short term treatment of psychoneurosis during the two and a half years following May, 1953. Many of the cases had been treated by

me at Holloway Sanatorium during the years before 1953, but there were many recent cases including eleven who were under observation with the diagnosis of psychoneurosis for several months before it became clear that they suffered from schizophrenia.

In general the opportunities here have been to study the early and the residual symptoms of the disease. As a comparison 61 uncomplicated cases of anxiety state or psychoneurosis were analysed in so far as the findings could be compared with schizophrenia.

Five basic symptoms were found in every case of schizophrenia, which were absent in every case of anxiety. Almost everything which follows was observed in the complete absence of hallucinosis and clouding of consciousness.

1. Increasing difficulty in organizing thoughts.
2. Increasing failure to plan.
3. Increasing difficulty in separating past thoughts from past events.
4. Increasing failure to recognize absurdity.
5. Increasing failure of insight.

N.B. Since all these difficulties can be present to some degree in healthy people, it is the *increase in the difficulties* which is diagnostic when recognized. All these difficulties preceded the development of delusions, often by a very long time.

Eventually, in the large majority of cases there is a failure of measurable intelligence, with diminished ability to learn (which can be absolute) and difficulty in the use of words (which can go on to jargon aphasia).

There is also a loosening of repression so that discussion of sexual matters and of hatreds becomes considerably more free.

In the standard case there is the development of a special kind of mental defect.

Particularly in the early stages there are acute emotional disturbances, different from and more explosive than are seen in anxiety states and accompanied by veritable torment when insight is still reasonably well preserved. N.B. Both the emotional disturbances and the failure of repression may also occur long before delusions develop.

Hallucinations occur in considerably more than half of schizophrenic patients, and they are sometimes extremely intense, but more often than not only ideas and memories about hallucinations are finally left.

Clouding of consciousness is a frequent development in the acute stages of the illness, being most likely to develop when intense hallucinosis renders a patient with the basic defects unable to maintain his hold on reality.

Consequences of the Disease

1. Increasing failure of working ability.
2. Increasing failure of social relationships.
3. Increasing dependence on the family, the doctor, etc., despite whatever delusions may have developed.

Reactions to the Disease

Fear, either open or disguised as anxiety symptoms is uniform in the early stages, and may be complicated or not by the intenser emotional disturbance already mentioned.

Other normal mechanisms in the face of difficulty and failure, such as withdrawal, day-dreaming, denial of illness, suspicion and projection, developed.

Projection is particularly important because when the basic difficulties are bad enough delusions easily follow.

False Diagnosis

The disease is often undiagnosed for many years, indeed abnormalities in childhood are extremely frequent.

As already stated, the basic defects of function are not diagnostic until they are obviously increasing, since endowment varies so much. *As a rule* a false diagnosis is made at first, anxiety state, hysteria, obsessive-compulsive neurosis, depression, and so forth and treatment on the basis of such diagnosis may go on for years.

Where is the Lesion?

If only the failing ability to plan is considered, frontal lobe defect becomes obvious. (There is plenty of other evidence which makes this an inescapable conclusion.)

The lateral nuclei and the posterior part of the hypothalamus are probably affected (see below under Preliminary Brilliance). The temporal lobes are almost certainly concerned with the hallucinosis and there is evidence of some failure in the parietal lobes.

The damage can be summed up, as it was by Miskolczy, as damage to the particularly "human" parts of the brain.

What is the Lesion?

The evidence concerning hereditary and childhood abnormalities makes it clear that some "constitutional" basis is present (apart from the stresses produced by the disease itself; the schizophrenic histories show less stress than that suffered by anxiety patients). The 'rejecting mother' theory is quite untenable.

Preliminary Brilliance

There was some evidence that this occasionally occurred in childhood but certainly fifteen of the sixty-one schizophrenics had a period of very much heightened ability which can only be explained in terms of facilitation of brain function. This was followed by dysfunction and finally by arrest of function in those areas affected. This is in line with the intense hallucinosis and the complaint "Everything in my past has become so vivid and clear to me" to quote a patient I have seen recently; here again facilitation is followed by dysfunction and quietude. The chief evidence for posterior hypothalamic involvement is the intense, distinctive and uncontrollable emotional experiences which sometimes overwhelm the patients in the early stages of the disease. It is suggested that in varying order all the parts of the brain affected exhibit facilitation, followed by dysfunction (comparable to paraesthesiae), and ending with loss of function.

This is in line also with the extraordinary catastrophes which develop during the insulin coma treatment of schizophrenia under conditions of unremitting observation, and the even more extraordinary fact that in proportion to the mindlessness resulting the patient shows eventual striking improvement, facts totally at variance with experience with healthy people with islet-cell adenoma.

Chemical Toxins and Other Considerations

There may be much in the theory of chemical intoxication, but this still leaves the extraordinarily wide and yet extraordinarily limited extent of the

disease to be explained. The malady may be an expression of a biological variant involving instability or vulnerability to unknown factors. Evidence is presented to show that individuals who represent "superior" people as compared with their parents are most in danger, in other words, the disease may be in a limited sense at least an expression of evolutionary progress which does not quite succeed.

Treatment is considered mainly in so far as it underlines the considerations put forward by the paper.

CONCLUSION

The hypothesis is advanced that schizophrenia is an expression of an inborn defect in those parts of the brain which are particularly human, a progressive disease which throws regions of the brain into disorder and then out of action and which spreads usually from the frontal poles backwards, although it may start in the temporal lobes or in the hypothalamus, producing the various 'types' of the disease.

The disease often makes itself evident in infancy or childhood, more commonly in adolescence and frequently much later in life. The malady may be heralded by heightening of function, followed by dysfunction and brain 'paraesthesiae' and then, in most cases, by abrogation of function and a peculiar form of mental defect. Dysfunction in the hypothalamus initiates pituitary, suprarenal, thyroid and sex gland disturbances without actual disease in these structures.

The inborn error produces ontogenetically inevitable pathology or pathology made manifest by factors not recognized at present to be pathogenic, and the disease tends to spread in tidal fashion with periodic recessions during any one of which it may become arrested. It is suggested that schizophrenia would be better known as phylogenetically and ontogenetically determined encephalopathy (the shortened term *genetic encephalopathy* would probably cause no difficulty despite other encephalopathies).

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MENTAL CHANGES AS A PRESENTING FEATURE IN SUBCORTICAL CEREBRAL LESIONS*

By

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LESIONS of the cerebral cortex are generally accepted as a potential source of psychological change, and the difficulties that may arise in distinguishing between one of the psychiatric illnesses at present regarded as idiopathic and one due to a lesion of the prefrontal cortex, the temporal lobe or the posterior parietal region are well recognized. Since there is normally a continual functional interplay between cortex and subcortical structures, lesions in the latter may also be expected at times to produce changes in psychological function.

That such lesions may give rise to gross alterations in consciousness, apart from those due to any general rise in intracranial pressure, has been recognized at least since Foerster (1926) drew attention to them. In 1944 Jefferson elaborated the theme that brain stem structures were important in maintaining consciousness; and Cairns (1952) reviewed his wide experience of such lesions and the changes they may produce in crude consciousness or awareness. These changes do not usually present as psychiatric problems, since the all-or-none way in which consciousness is altered and the accompanying neurological signs indicate their organic basis. However, subcortical lesions also appear able at times to produce more insidious psychological change, and the five cases described in this paper serve to illustrate this point. Such changes have a two-fold interest. In general they demonstrate, for a neuropsychiatry which views the brain as the organ of adaptive behaviour, the complexity and integration of the neurological substrate of mental life. More particularly, they may simulate idiopathic psychiatric illness and give rise to diagnostic difficulties, especially as conventional neurological abnormalities may be absent.

Three of the five cases discussed presented with psychiatric symptoms: one was first thought to be a cortical dementia; while in the fifth, a local subcortical lesion was recognized *ab initio*, but it produced a reversible memory defect of the type associated with a Korsakoff syndrome, and the implications of this were considered of sufficient interest to merit recording the case.

CASE MATERIAL

Case I. (R.I. 184607)

A housewife of 29, previously capable and well-balanced, had a three months history of increasing general incompetence and emotional instability, mainly of depressive type. There was no family history of mental disease. Her domestic situation was unsatisfactory. She looked after her three-year-old daughter and her mother, who had hypertensive heart failure. Her husband, who only sporadically visited the household, had been in the hands of the police and was once more up on a charge of larceny.

Two months before she was seen she had an illness characterized by fever, vomiting and headache. This followed a similar attack in her small daughter, and it had been diagnosed as "food poisoning". The fever had subsided, but some headache and occasional vomiting persisted.

Her sister reported that during the past month her memory had been capricious, and she seemed increasingly uninterested in her family's welfare. She appeared muddled at times. On one occasion she had put a pudding into the oven on top of a meat pie so that they had become mixed and cooked together, and had served them without comment. On another she

* Substance of a paper read at a Clinical Meeting at the Warneford Hospital, Oxford.

had retired to bed at mid-day for no reason, and had refused to get up until her sister made her. In the past ten days she had had two "faints", with sudden falling and probably loss of consciousness.

On examination there were no abnormal signs in the central nervous system. In particular her optic discs and fundi were normal. The most striking feature was her incongruous behaviour. At times she would answer questions promptly and correctly, at others she would pause and look in a puzzled way round the room as if searching for the answer. She would smile or laugh for no reason, and on one occasion broke down and wept for no apparent cause. She performed various motor tests accurately, but occasionally perseverated and repeated inappropriately the action of a previous test. She was orientated for time, place and person, and was aware of the mistakes she made in tests and of the incidents recalled by her sister; but her reaction to them was curiously apathetic.

Despite the negative findings, her two unexplained faints and some slow wave abnormality in the occipital region in her electroencephalogram, suggested the need for further neurological investigation. Lumbar puncture gave a normal C.S.F. pressure, but a protein of 100 mg. per 100 ml. Following this she became obviously confused and had an attention defect in the left half visual field, and a suggestion of left hemiparesis. Ventriculograms showed a large space-filling lesion in the right basal ganglia, which proved on biopsy to be a glioblastoma. She was referred for deep X-ray therapy.

Comment. This lady presented as a psychiatric problem. Her symptoms were at first thought to be an anomalous reaction to her domestic worries; though her later incongruity of behaviour led her doctor to consider a schizophrenic illness—a diagnosis certainly rather suggested by her behaviour on first examination at hospital.

Case 2. (R.I. 96382)

A housewife of 38, who also did secretarial work, had a history of two months abnormality of behaviour. There was no family history of mental illness. Her family had always considered her rather emotional and prone to exaggerate, but she had done well at school and at work. She had been married for five years and was very disappointed that she had no children. Her husband worked away from home and only came back at weekends. She resented this.

Her behaviour change was marked, and its onset was associated by her husband with an attack of mild influenza. It was characterized by sudden emotional upsets on the most trivial provocation, when she would become angry or tearful. She would also at times suddenly leave what she was doing and wander off, with no clear memory afterwards of where she had been. Thus during a cycling holiday with her husband, he had gone on ahead down a hill and then waited at the bottom. When she did not appear he went back to find her bicycle propped up at the roadside. After searching for some time he met her walking back to the road across some fields. She would give no explanation for this, and said she could not recall where she had been. Again, one morning she refused to come down to breakfast, although she had got up and started to dress in a normal manner, but lay half dressed on her bed and refused to reply to her husband's questions. He went down and she appeared later and had no recollection of the incident. Other similar incidents had occurred; but in between her behaviour had also been childish and over-emotional. Her husband regarded it as quite different from her usual self. However, she was able to carry out her household duties and her general intelligence and memory seemed unimpaired, apart from the amnesic episodes mentioned.

She had twice complained of an attack of tingling in her lips with cramp in her feet. On these occasions she was emotionally upset and breathing deeply, and the symptoms were considered to be due to hyperventilation tetany. She slept poorly and for a month had taken barbiturates sporadically. Apart from this there were no physical symptoms. She herself had complained of insomnia and constantly worrying about nothing, and it was for this that she had consulted her doctor.

Examination by her own doctor and a medical specialist had shown no physical abnormalities. Some three weeks later, on the day of her admission to hospital, she had refused to get up to breakfast, but had later appeared looking dazed and had been taken back to bed again. During the morning she fell out of bed and there was some question of her having had a fit, but this was never clearly established. She was found in a stuporous condition at mid-day, and from then until her death three months later she never regained full consciousness.

No localized abnormalities were found in the nervous system or elsewhere. At times her eyes were open and she appeared to follow movements, but she responded only to noxious stimuli such as pinprick, and later was unresponsive and in deep coma. Her electroencephalogram showed a diffuse slow wave abnormality, more marked anteriorly. Her C.S.F. was normal. Burr-hole exploration and ventriculograms also showed no abnormality. She developed pressure sores and a hypostatic pneumonia which provided the *exodus lethalis*.

At autopsy the brain showed a healed meningitis under one burr hole, with a small healed abscess in the brain needle tract. Cortical convolutions were rather flattened, but there was no other gross pathology. Histology revealed some evidence of inflammation with perivascular cuffing in the hypothalamic region and floor of the third ventricle.

Comment. For two months this lady presented with emotional upsets and occasional fugue-like episodes, which were regarded as hysterical, as was her apparent hyperventilation tetany. For the first week of her hospital admission the possibility of a catatonic schizophrenia was considered, but it seemed much more likely despite the absence of abnormal neurological

signs, that she had an organically determined illness, and after her negative ventriculograms a diagnosis of encephalitis lethargica was in fact entertained.

Case 3

An unmarried man of 27, a post-office worker, had suffered for some two years from attacks of acute panic. There was no family or personal history of mental disorder. Initially the attacks occurred only once in three or four months, but their frequency had increased and this had caused him to seek medical advice. He was intelligent and co-operative, and gave a vivid description of his attacks. Quite abruptly and without warning he would feel terrified as if something awful was about to happen. He felt compelled to get home and to his own room as soon as possible. Once there, he would lock the door and bury himself under the bedclothes fearful of the least sound from the outside world. His terror was quite diffuse and there was no fear of impending death. Seen at the beginning of an attack, he was pale and with rapid pulse and dry skin. Each attack lasted for half to three quarters of an hour, and ceased rapidly, though not as abruptly as its onset. No psychogenic factors were discovered. Between attacks he was well and able to do his work; though latterly there was some general apprehension about their further occurrence.

On examination there were slight but unequivocal signs of Parkinsonism. His face was immobile, ocular convergence was defective, and there was bradykinesia and a little cogwheel resistance to passive movement in the left hand. He showed evidence of excessive salivation. Skull X-rays and C.S.F. were normal.

Six years previously he had had a febrile illness which had kept him in bed for three weeks. For ten days of this he now had no clear recollection, and his mother described him as "delirious" at the time. The condition had been diagnosed as severe influenza by his general practitioner.

Comment. This patient was regarded as a post-encephalitic Parkinsonism. The evidence associating his panic states with the Parkinsonian lesion was only circumstantial. The attacks were suggestive of a discharging lesion in Hughlings Jackson's sense, and were reminiscent of true vaso-vagal attacks, though no specific *angor animi* appeared. Similar acute anxiety attacks are seen in post-encephalitic states in association with the sudden attacks of disordered respiration that sometimes occur. However, no evidence of respiratory upset was elicited on careful questioning here. The interval of some years between the original illness and the subsequent symptoms does not exclude a causal connection, since similar intervals are seen in the narcolepsy-cataplexy group of sequels. The general setting of the attacks, the absence of any discernible psychogenesis and their amelioration with phenobarbitone and tincture of stramonium during some months of observation, seemed to justify regarding them as post-encephalitic manifestations.

Case 4 (S.M.H. 27453)

A housewife of 59 with no previous personal or family history of mental disorder, was well until the unexpected death of her mother, when she gradually became increasingly depressed and unable to manage her housework. Her family noticed marked memory impairment. She would put household utensils and money carefully away, and then forget where they were. This upset her greatly. When first examined there were no abnormal physical signs, and her symptoms were considered to be a psychological reaction to the death of her mother two months before.

Over the next six months her symptoms persisted and she developed precipitancy and occasional incontinence of urine, and some ill-defined difficulty in walking. Examination now revealed a rather euphoric woman with much emotional lability. There was a marked memory defect for recent events and a poor performance on formal memory tests. There was some nominal aphasia and a suggestion of constructional apraxia. Her optic discs showed no papilloedema. A fine tremor of the outstretched hands was seen, but no limb inco-ordination, dysarthria or nystagmus. She had no true ataxia of gait, but she walked in a shuffling manner and complained of feeling unsteady. Her tendon jerks were brisk and there was a slight cog-wheel resistance to passive movement, but no other abnormalities in the central nervous system. Her C.S.F. showed a protein of 90 mg. per 100 ml. but was otherwise normal in content and pressure. Her electroencephalogram showed some generalized abnormality with mixed slow and fast wave (3, 6 and 22 cycles per second) but no paroxysmal activity. There was some poorly developed alpha rhythm which blocked on eye opening.

She was considered to be an early organic dementia, probably a pre-senile cortical atrophy. However, in view of the high protein, lumbar air encephalograms were attempted on two occasions, and as they were unsatisfactory, ventriculograms were done. The burr holes revealed normal supratentorial pressure. There was some enlargement of the lateral ventricles; the third ventricle was normal; but the fourth was distorted and suggested a posterior fossa space-filling lesion.

At operation a haemangioblastoma of the right cerebellar lobe was successfully removed by Mr. J. Pennybacker. Although there was some displacement of the brain-stem and cerebellar tonsils, posterior fossa tension was not raised. For two weeks after operation she was worse mentally and physically. She was confused and disorientated for time, place and person and had gross cerebellar dysfunction. During the next three months, however, she improved rapidly and steadily. On discharge home she had no abnormal physical signs, apart from a

slight nystagmus and clumsiness of right hand movement. She was sensible, co-operative and fully orientated, and her memory both in everyday life and to formal testing was normal. She returned to full household duties and social life, and the improvement has been maintained for the past three years.

Comment. This lady after an initial depressive reaction, presented as a generalized deterioration of higher cortical function. The severe memory defect and the nominal aphasia suggested an Alzheimer or Pick's disease and the slight suggestion of extrapyramidal rigidity seemed to confirm this. The rapid reversal of the dementing process after removal of the cerebellar tumour was striking, and rebutted the view based on the original clinical evidence that she was suffering from an irreversible cortical degeneration.

*Case 5 (R.I. 111669)**

A young man of 22, a farmer's apprentice, was admitted for investigation of headaches and sudden unpredictable sleepiness. After some 18 months observation and treatment he died and autopsy confirmed the clinical diagnosis of a large cystic and solid tumour involving the floor of the third ventricle. Posteriorly it had stretched the cerebral peduncles and the pons was slightly flattened, and anteriorly it abutted on the optic chiasm. The lateral ventricles were large, but there was no evidence of cerebellar or tentorial coning. The tumour had pushed up anteriorly into the third ventricle; the tuber cinereum was largely destroyed and the inferior aspect of the left thalamus was involved.

For a time the tumour had interrupted C.S.F. circulation and had caused a marked rise in intracranial pressure. This was accompanied by a slight left hemiparesis and defect of upward eye movements, and by severe confusion, drowsiness and even coma. His electroencephalogram then showed much high voltage random theta and delta activity, with no alpha rhythm. Ventricular tapping relieved the pressure and the gross confusion and drowsiness cleared for a while. His electroencephalogram now showed some 9 c.p.s. alpha posteriorly. There was no delta or random slow-wave activity, but runs of bilateral synchronous theta occurred.

As a ventriculocisternostomy did not give permanent improvement, the cystic part of the tumour was directly tapped. Shortly after this the patient was alert and co-operative, and would answer questions and obey commands readily. However his memory for recent events was severely impaired. He could not remember what he had for his last meal, nor what he had been doing during the preceding few hours. In reply to questions he would confabulate with details of his work on the farm. He described feeding the pigs and milking the cows, and could be led on to elaborate this, giving the names of the various beasts and their idiosyncracies. He failed in simple memory and retention tests, but would usually confabulate an answer, and would not admit that he could not remember. However, his digit span was 7 forwards and 5 backwards; and he gave the year, the day of the week and the date correctly (he had just been reading the paper). He admitted he was in hospital with doctors and nurses around him. When the discrepancy between this and his previous statements was pointed out, he said he had been out on the farm just before he came in.

As more generalized confusion and drowsiness recurred, the cyst was again tapped. Following this, he again became fully orientated and his confabulation ceased. As the cyst filled up again the Korsakoff state reappeared and then passed into drowsiness and confusion. The sequence was repeated on several occasions.

Comment. This case never presented any diagnostic difficulty. He was of interest as showing that one mechanism involved in the registration and organizing of memory appears to lie in the grey matter in the floor of the third ventricle. At the relevant times the patient showed in a setting of general alertness the two features of a Korsakoff syndrome, amnesia and confabulation. He was unable to retain memories of events occurring at the time though he evidently perceived them, and he would fill in the gaps with confabulated material. This was always part of his past experience and was never invented. The difficulty appeared to be one of organizing past experience in its correct temporal setting—a severe but partial disorientation for time.

Such a disability has been noted previously in lesions in this situation, both in third ventricular tumours (Williams and Pennybacker, 1954) and in tuberculous meningitis (Williams and Smith, 1954) where inflammation and exudate are maximal around the base of the brain. Moreover, histological changes in classical alcoholic Korsakoff's syndrome have been found most consistently in the hypothalamic region.

DISCUSSION

Localized subcortical lesions occurred in basal ganglia, hypothalamus or brain-stem in all these cases and in four of them presenting symptoms were in the psychological sphere. In the initial stages they did not involve gross changes

* This case was discussed in detail by Williams and Pennybacker (1954, Case 4). Here it is mentioned only to illustrate the occurrence of confabulation without general confusion, and the EEG changes associated with raised intracranial pressure.

in consciousness, though in some cases these supervened later. Early changes were insidious, but were quite evident to relatives, friends and often to the patients themselves. Increased lability and incongruity of affect, acute anxiety, depression and apathy were all seen. Some intellectual change was also noted in three cases, in one amounting to a mild dementia. The changes are not easily summarized, but they resulted in a breakdown of normal adaptive behaviour sufficient to call for medical advice. In the two cases with no abnormal physical signs, episodic disturbance of intellectual functions and a perhaps anomalous personality change raised the suspicion of an organic lesion, but it was only the findings of adjuvant tests that gave a definite lead.

Any space-filling intracranial lesion may produce a general rise in intracranial pressure. A stenosing or inflammatory lesion if strategically placed may have the same effect by interfering with C.S.F. circulation. Such pressure changes will have widespread effects on cerebral function, and will be of no localizing value in attempting to assign specific functions to particular sites. It is therefore important to exclude this pressure factor in the cases we are considering.

The physical evidences of this—papilloedema, raised C.S.F. pressure at lumbar puncture, tense intracranial contents at operation, and characteristic electroencephalogram pattern—were not present, except in Case 5. There, as has been pointed out, it was at times when the general intracranial pressure had been operatively lowered that the symptoms of particular interest to us emerged. Moreover, the typical mental changes of raised pressure—a rather generalized cortical dysfunction with marked loss of responsiveness even to a level of deep coma—were also not part of the initial picture in these cases. Indeed, Case 5 illustrates well the diagnostic value of the type of mental change observed. When his intracranial pressure was in fact raised, the presenting psychiatric picture was one of drowsiness or coma; when pressure was reduced he became alert and readily accessible, though confabulation and pseudo-reminiscence were easily elicited. There is therefore nothing to suggest that the symptoms observed in these cases were due to general pressure changes, rather than to the specific site of lesion.

Psychiatric symptoms may at times arise during an organic illness and be unrelated to it in a specific causal sense. In these cases, this seems unlikely. In all of them the changed behaviour was clearly recognized by relatives and represented a departure from their usual method of dealing with life's difficulties. In three, treatment directed to the organic lesion relieved the symptoms, even though in one (Case 4) they had seemed at first to be occasioned by emotional shock.

Previous descriptions of the effects of subcortical lesions on mental functions have generally emphasized a crude change in consciousness, loss or gross clouding of consciousness, drowsiness or coma. Foerster (1926), Reichart (1929), Cairns *et al.* (1941) and Jefferson (1944) have all described such changes. More recently, the defining by Magoun (1950) and his colleagues of the reticular formation in animals—a band of tissue lying between the main afferent and efferent pathways, and extending from the thalamus through the brain-stem to the medulla—of which stimulation produces a diffuse activation of the cortex and destruction a condition akin to sleep or coma, has renewed interest in the possible neurological mechanism of such symptoms in man. However, no convincing evidence is yet available for any homologous well-defined "subcortical activating system" in man; though the work of Jasper (1954) and others in correlating the electrical activity of limited areas of the thalamus with diffuse

cortical changes and accompanying alterations in mental state, seems to point that way. Less convincingly, French (1952) has suggested that in three cases with prolonged coma, autopsy findings supported a lesion of some such mechanism, and Cairns (1952) much more tentatively raised the possibility in some of his cases.

In both these instances the mental changes were in the sphere of crude consciousness or awareness, though Cairns specifically mentioned more circumscribed changes in memorizing: as have others (referred to above, see Case 5), in discussing lesions in the region of the third ventricle. In the present cases mental changes were more subtle and were unaccompanied at the relevant times by any general confusion or loss of awareness. They did not suggest involvement of any all-or-none mechanism for general wakefulness or awareness.

The personality changes in adults and the more striking psychopathic behaviour in children, without neurological abnormality, which may follow von Economo's encephalitis, where basal grey matter and brain stem tends to be maximally involved, may also be examples of dysfunction of these subcortical areas. The difficulty in accepting this argument without reservation, is the known occurrence in some cases of changes in the frontal lobes as well.

Whether the changes noted in our cases represent the effect of simple interruption of some fixed anatomical pathways, or (as I think more probable) the result of abnormal neuronal discharge actively interfering with normal cortical function, they seem to imply a more elaborate functional interrelation in the mental sphere between cortex and subcortex than has previously been emphasized; and one which allows localized subcortical damage to produce insidious mental changes.

The presence of an organic brain lesion was finally established without doubt in all five cases. In four, however, an alternative psychiatric diagnosis was considered for some months. Such lesions may therefore lead to diagnostic difficulties. Of greater interest and importance is the light that they may shed on the neurological basis of psychological function. The mental symptoms observed were due directly or indirectly to involvement of limited areas of subcortical tissue, in these cases by structural organic damage. However, the function of these same areas may be affected by transient and reversible lesions; from ischaemic or toxic processes or even from unusually intense bombardment of otherwise normal synapses in the region. When, therefore, such symptoms are seen in an apparently psychogenic setting the possibility must be considered that here also similar neurological mechanisms are involved. This may have implications both for the origin of symptoms and for their treatment. It should be emphasized, however, that this does not preclude psychological stimuli acting via cortical mechanisms as a primary factor in such disturbances of mental function, since cortico-subcortical connections are probably as abundant as those in the reverse direction. Indeed, it is the close similarity of symptomatic end-results from either primary psychological factors or organic subcortical lesions that emphasizes the need both for clinical vigilance and for renewed consideration of cerebral function in mental disease.

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OUT-PATIENT PSYCHOTHERAPY UNDER THE NATIONAL HEALTH SERVICE

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WITH the coming of the National Health Service, there seemed a real chance of establishing fuller psychotherapy in Out Patients. This is not to imply that psychotherapy was not given before; but in most hospitals it was necessarily limited except in special cases, and there was a tendency to leave it a good deal to junior staff who had the time and wanted the experience.

Theoretically, at least, now there was nothing which might not be attempted. In fact, there was still a limited, but now defined number of hours and a rising case load. This paper describes one attempt to use these improved conditions. Results and methods of treatment are not claimed to be exceptional in any way, but with the continued introduction of new methods, where of necessity the patient's individuality is less considered, it is salutary to reconsider the results of more personal methods, particularly as it continues sometimes to be said that psychotherapy is basically vague and wasteful of time, and vaguer still in results.

There is little difficulty in assessing practical results as far as the patient's subsequent outward behaviour is concerned, and this is after all what chiefly matters to the patient and people round him. What is much more controversial is to make a satisfactory assessment of deep changes in the personality, as re-examinations of sufficient penetration to be convincing are too lengthy to be accumulated in any number, except as a separate research project. There is a further practical difficulty in the follow-up of patients. A certain number move away, and it is not always the unsuccessful case which for emotional reasons does not want the past re-opened.

Psychotherapy is a subject with many approaches, so that the very moderate allowances of time here discussed may seem quite inadequate to some, and even excessive to others. To the referrer, the recommendation "for psychotherapy" may seem perfectly conclusive, though from that point several courses diverge. The approach here has been basically analytic, as whatever the controversy of the schools, it is difficult to think in coherent terms of psychopathology without it. On the other hand, some uneasiness has been felt in trusting to theory in the face of obscurities; nor can apparently lasting recoveries reached by other means be overlooked. The approach to each new case has been therefore somewhat undogmatic. Further, psychotherapy remains a very individual affair, not only in that therapists may be temperamentally better suited to one or other approach, but also because similar treatments are not necessarily suited to patients with the same general diagnosis. Admittedly this is partly the fault of the simple descriptive nomenclature. Nevertheless the personal factor, which it is so often the aim of the statistical method to exclude, remains part

of the total reaction to be coped with and utilized in the cure—not that the utmost scrutiny of results is any less necessary.

The question of time is almost as important as approach, as it limits the scope of treatment and sets the claims of the many against the more intensive and rewarding investigation of the few. The treatment here is confined within three half days a week, one of which is chiefly taken up with seeing new referrals, which are not necessarily suitable for psychotherapy. The practical time used, therefore, is about seven hours weekly.

The sources of referral are mixed. There are a certain number of cases from colleagues in the department, for deeper psychotherapy, chiefly character disturbances, long term neuroses in tolerable personalities and sexual difficulties and perversions. But by far the larger proportion (78 per cent.) were seen as ordinary referrals for psychiatric opinion, largely from outside the hospital. A point is made of this double origin, as although there is some increase in long term cases, the series largely represents a cross section of psychiatric out patients.

When one comes to consider what psychotherapy can be given in something over two half days a week, it will be seen that if analysis in the full sense were attempted, one might be limited to as little as two or three new cases a year, after the first batch had been taken on. Not all cases referred for psychotherapy are suitable for deep analysis, but sufficient cases are referred to make a very long waiting list at this rate. Full analysis is not therefore practical, and unless it could be concealed within a mass of short treatments as compensation, it is improbable that the N.H.S. would sanction the outlay. It is of course also true that apart from the fairly exacting criteria of personality, not many patients are so placed that they can face the concentrated treatment, which may involve much dislocation of their routine, together with the difficulty of finding or keeping a job which will allow all this.

Evening sessions were not possible in this series. In practice the maximum time was two half hour sessions a week, though longer sessions were occasionally given. If deeper psychotherapy is to be talked of, one cannot go below a certain concentration of treatment, which allows sufficient time for detailed insight to be acquired by the therapist, and either a sufficient insight to be given to the patient in terms of his inner conflicts and the real situation, or at least, for the transference and real situation to be manipulated so that maturation can take place in the patient, rather than just persuasion. Indeed, it is only a proportion of the cases later called "Medium" and "Long" that one could say that analytical treatment of a kind had been approached.

A total of 140 patients seen over 27 months from February, 1949 are reviewed, of which 110 (78 per cent.) were referred from outside the department; 67, nearly half, were taken on for psychotherapy. An indication that the majority were not a specially selected sample for psychotherapy is that the remaining 73 included 16 mainly organic cases, admittedly some within the psychiatric sphere such as Pick's disease, senile dementia, and toxic confusional state, and others with indistinct symptoms often masked by an overlay. One case also of enuresis in a heavy sleeper successfully treated by dextroamphetamine on a purely functional basis, showed inconclusive evidence of being psychogenic.

There were also 9 cases of functional psychosis and 5 of varying degrees of mental defect.

This leaves 42 cases, 33 of neurosis, and 6 of psychopathic personality, including mild addiction, and 3 of minor depressive illness. These were all cases where psychotherapy in Out Patients was not considered indicated or was

refused, except one referred to a colleague for support. Some refusals are bound to occur, and it was thought fair to extend this classification up to the third interview, unless the patient has definitely co-operated.

The disposal of these cases is classified below, and this by exclusion gives some indication of the spread of psychotherapy undertaken. The figures in brackets are for cases which were referred after some psychotherapy.

	Acute and Subacute Anxiety States	Chronic Anxiety States	Hysteria	Obses- sional Neurosis	Psycho- pathic Person- ality	Minor Depres- sion
Total for psychotherapy and other disposals ..	20	38	22	13	9	7
OTHER DISPOSALS:						
Refusals	2 10%	6 15%	5 23%	(1)		
In-patient treatment	2 (1)	3 (5)	1	(2)	4 (2)	1 (1)
Long term analysis ..		2 (1)				
CO ₂ inhalation ..	1 (1)	2	1			1 (1)
To G.P. for treatment	1		1			1
To G.P. for support only—too chronic		1	4 18%		2	
Group treatment ..		1				
Total including bracketed figures ..	8 40%	21 54%	12 55%	3 23%	8 89%	5

Although this paper is devoted to psychotherapy, the treatment of the patient must inevitably be considered on a wider basis, and there has been no hesitation in referring cases for other treatments or combining them with psychotherapy, if there seemed an advantage, though this is less suited for delimiting the effectiveness of psychotherapy. Thus three cases which had made fair progress were referred for admission, mainly for the convalescent effect, and are not recorded among the psychotherapy cases, while five others on a safe assessment might have been admitted earlier, if it had not been felt there was some chance of maintaining them out of hospital. The bracketed figures for admission do not then consist completely of failed psychotherapy cases; though here and elsewhere brackets indicate the preferred line of treatment.

The combined treatments where psychotherapy was preponderant, are not included here. This applies to three cases which had CO₂, and two treated in a group by the writer as a continuation of their individual treatment.

In the table it is significant that the hysterics have the largest proportion of cases refusing or considered too chronic, whereas a much larger proportion of the chronic anxiety states are suitable for various active treatments.

The figures for the obsessionals cannot be taken as entirely typical, as certainly they were less rigid than the average. It is possible that the effects of small numbers and special referrals have combined here. Their absence from under the heading of "long term analysis" is also partly artefact, as only special circumstances make this treatment available.

Six cases were referred for treatment with 30 per cent. CO₂ inhalation in 70 per cent. oxygen, in the hope of abreacting tensions which could not other-

wise be reached. Five other cases had this treatment in conjunction with psychotherapy, one with lasting success, to which it is unlikely that the psychotherapy contributed.

Ten cases were referred back to their doctors, including three for treatment beyond support and drugs.

Barring the obsessionals, the total percentages for other disposals correspond roughly with the difficulties to be encountered, as might be expected, with chronic anxiety and hysteria together high, and psychopathy at the extreme; but it will be seen later that the follow-up on chronic cases is not discouraging.

The diagnostic classification of cases in the table is the common descriptive one, except that Anxiety Hysteria is combined with the Acute and Subacute Anxiety States, as for practical purposes in therapy one merges into the other. It is felt that in a short paper too much elaboration would follow if divisions were also made in terms of psychopathological theory. Nevertheless the classification tends to produce unnatural simplification, and does not distinguish the overt neurotic reaction from the personality disorder, though the latter's chronicity may be indicated by its inclusion among the chronic neuroses. An attempt to bring out the issue of personality more clearly is made in a second table later, but some special kinds of disorder remain submerged. This applies particularly to sexual cases.

In so far as these are classifiable under anxiety neurosis, hysteria and obsessional neurosis, they have a similar prognosis, though they may tend to be monosymptomatic superficially, and factors of personality are more predominant. Their inclusion in the table above boosts the "Refusal" and "Too chronic" rates. Two of the six chronic anxiety states, and two of the five hysterias breaking off treatment were sexual cases, as were the one chronic anxiety state and two of the four hysterias labelled "too chronic". The delay before seeking advice was anything up to sixteen years.

At least an equal number of sexual disturbances occurring as part of a general neurosis, are not complained of in the first instance, and sexual disability is frequently discovered in the other partner, often apparently taken for granted. This opens up possibilities in treatment which are quite beyond the available resources, and only a proportion of these partners were taken on.

Homosexuality, cases of which are now coming up much more frequently, belongs in so far as it is psychogenic, to the deeper personality disorders, and is therefore even more uneasily accommodated in the classification, and this also applies to the other perversions.

TREATMENT

The treatment given in this series has been put in three categories:

Short (S)—Discussion, reassurance and guidance, fortified by mild medication, i.e. light sedation or stimulation by day and sufficient sedative at night to give sleep, if necessary. The therapist aimed at being a well disposed third party outside the conflict, but willing to listen and advise, and if necessary persuade. Sessions averaging ten minutes every two to four weeks.

Medium (M)—Deeper discussion, with more attempt to obtain insight in the patient, and to talk out attitudes and past experiences. Some use of free association; occasionally of abreaction and examination under drugs; occasionally some persuasion. Medication if necessary, as above. Sessions averaging 30 minutes, sometimes more, once a week, but in distinction from the long cases not persisted in regularly.

(M and S)—After a period, usually a third to a half of the whole duration, treatment may be carried on as in a short case.

Long (L)—Analytic approach, with free association and some interpretation of transference and resistance. Present situation treated in terms of past patterns and personality. Medication little used, as confusing to the transference, and less necessary due to frequency of visits. Sessions 30 minutes, usually twice weekly. As may be seen, even this frequency would mean that seven long cases would absorb all the time available, for as long as they were being treated.

RATING OF RESULTS

I++ Symptom-free or very much improved, i.e. recovered for practical purposes.

I+ Much improved, but not excluding minor symptoms, not impairing the general effectiveness.

I Improved. Some more serious symptoms present, particularly with stress, but the patient has made definite improvement and copes with his environment.

I? In some cases this doubtful assessment has been added, meaning that there is an improvement, but of uncertain value, or the time has been too short to test the result.

I.S.Q. Unchanged.

Worse.

All these ratings are made on the psychiatrist's assessment of the patient, checked against his largely ascertainable achievement and social behaviour. Investigation has not gone deep enough in most cases to show what kind of change, if any, in psychodynamics has taken place, and a radical change could not be expected in most cases, though one hesitates to make this the monopoly of long term analytic treatment. Something in the nature of analysis would indeed be necessary to demonstrate the changed reactions, and again on follow-up, assisted by a battery of personality tests. Short of this, practical results checked against findings at interview are a reasonable criterion, as far as they go, though the more complex the undertaking, i.e. where longer analytic treatment has been given, the less sensitive and satisfactory the method appears. At least it escapes some of the difficulties of more theoretical judgments.

The follow-up was made at approximately eighteen months and is rated in the same way. Patients were seen if possible, but alternatively they could write replies to questions on the presence or absence of any symptoms, their general health, their reactions to work and people, and make any other comments on their state.

Of the 67 patients treated:

42 were interviewed	62 per cent.
12 replied by letter only	18 per cent.
	—
	80 per cent.

13 did not reply.

Of these at least

7 had moved away.

As has been said, apart from the failure to reach the patient it is not always certain that no reply is unfavourable. Also, though a relapse is accepted at face value, they are not all of bad import. There was one case who only relapsed under extreme strain and made a fair recovery, and another, followed up over three years, whose relapse was temporary and followed by solid progress.

RESULTS OF PSYCHOTHERAPY

Anxiety States (Acute and Subacute—including Anxiety Hysteria)—12 cases:

	On Discharge	On Follow-up after 18 months
Very much improved ..	6	4
Much improved	4	4
Improved	2	3

1 did not reply

That is all were discharged improved, 83 per cent. much improved or better.
On the follow-up all replying remained improved, 73 per cent. much improved.

There were no Long treatments:

Average time for Medium treatments	3 $\frac{3}{4}$ hours over 6 months.
Average time for Short treatments	1 $\frac{1}{2}$ hours over 4 months.

Hysteria—10 cases:

	On Discharge	On Follow-up after 18 months
Very much improved ..	2	1
Much improved	2	3
Improved	3	2
Doubtfully improved (involutional)	2	—

1 relapsed after 15
months improve-
ment.

Treatment broken off early 1

1 did not reply.

That is 70 per cent. were discharged improved, 40 per cent. much improved or better.

On follow-up 40 per cent. were still much improved or better, though with some slight falling off.

No Long treatments:

Average time for Medium treatments	3 $\frac{1}{2}$ hours over 7 months.
This average time is lessened by the inclusion of four M and S cases.	
Time for Short treatment	1 hour over 6 weeks.

Obsessional Neurosis—10 cases:

	On Discharge	On Follow-up after 18 months
Very much improved ..	2	1
Much improved	2	1
Improved	4	3
I.S.Q.	1	1
Improved?	1	

(returned to medical
treatment)

2 cases gone away
including one I++
1 case no reply.

That is 80 per cent. were discharged improved, 40 per cent. much improved or better.

The small numbers and the proportion of no replies lessens the value of the follow-up. If the untraced I++ case had maintained his progress the percentages would have been about the same.

Average time for Long treatments 48 hours over 16 months.

Average time for Medium treatments $7\frac{1}{2}$ hours over 8 months.

Average time for Short treatments $4\frac{1}{2}$ hours over 15 months.

One of the follow-up results included a temporary moderate relapse. This case improved with four more sessions two years after discharge, and a year later, i.e. three years after discharge, he is very well. He showed some depressive features, but largely reactive to the neurotic pattern. The previous progress he had made appeared to make it much more easy for him to cope on the second occasion.

The case rated I? was one of ulcerative colitis, and will be mentioned later. The improvement, such as it was, was independently assessed, but is hardly significant in this illness.

Chronic Anxiety Neurosis—17 cases:

	On Discharge	On Follow-up after 18 months
Very much improved ..	—	2
Much improved	6	—
Improved	8	5
Doubtful progress	1	1
I.S.Q.	2	2
		4 gone away.
		2 others did not reply.
		1 broke off treatment.

This table reads deceptively, as of the 6 I+ cases 2 improved to I++ and the other 4 had gone away, which unfortunately decreases the value of the follow-up.

That is 82 per cent. were discharged improved, 35 per cent. much improved.

On follow-up, of those that replied 70 per cent. remained improved, 20 per cent. very much improved.

Average time for Long treatments 24 hours over 12 months.

Average time for Medium treatments 6 hours over 15 months.

Average time for Short treatments 2 hours over 9 months.

To sum up, apart from the six cases which had Long treatment, the large majority, 89 per cent. are divided between Medium and Short treatments, with a natural tendency for some increase in length in the resistant cases. The Medium treatments, which were slightly over half, varied between $3\frac{1}{2}$ hours in the acute anxiety states and hysteria, to 6 and $7\frac{1}{2}$ hours in the chronic anxiety states and obsessionals, and the Short treatments from $1\frac{1}{2}$ hours in the acute anxiety states (1 hour in one case of hysteria) to $4\frac{1}{2}$ hours with the obsessionals. Though a virtue is not made of shortness, these figures cannot be far different in psychiatric time from those for physical treatments of neurosis and group treatment, and possibly shorter in some cases.

Figures may vary with the sample and the way cases are selected and rejected for treatment. As has been said, this series is an average teaching hospital referral, somewhat weighted with cases for more extended psychotherapy; and there are various alternative disposals to psychotherapy. The

percentage of cases accepted is as follows: Of the 80 available cases of neurosis, 49 (61 per cent.) received out-patient psychotherapy only, as the treatment of choice. Another 15 cases (19 per cent.) were started on psychotherapy, but were later referred for other forms of treatment. If one includes the psychopaths and minor depressions, the percentage receiving psychotherapy alone sinks to 54 per cent.

Of the 49 neurotics of all types, whose therapy was carried through, 41 were discharged improved, 24 much improved or better. If then these figures are applied to the original 80 neurotics, slightly over half would appear amenable to treatment by out-patient psychotherapy.

THERAPEUTIC APPROACH

The discussion of the approach of one therapist cannot claim to be comprehensive, and concerns here more matters of aim than technique. In undertaking shortened treatment, which shall still be reasonably full, there is a more pressing need to balance the claims of reality against the psychic drives which may be uncovered, and also to bear in mind how the patient may react to this stringency. Short cuts in themselves may increase complexity by mixing the psychic levels under examination.

The shortened analytic approach was rather on the lines of Alexander, French *et al.* of Chicago, in which methods were evolved to avoid the worst of the negative transference, by leaving that burden to rest as far as possible on the outside situation. Selective support was given to the patient depending on his previous traumata, and the more positive transference was used to help the patient to cope realistically and tolerate greater insight. But this struggle for insight could be to a certain extent by-passed by identifying and removing special emotional obstacles to it, often covered in their turn by much defensive rationalization. Indeed it was becoming apparent in many cases that some strengthening of the ego was essential before increased insight became tolerable, so that insight more or less set the conscious seal on an advance already achieved.

It may be argued that it is only a step further, but to the writer's mind a step into a different kind of treatment, for interpretation to be made to a pre-conceived pattern, which deals high-handedly with the data, and then uses persuasion to impose the interpretation on the patient. If this happens, then we are back in suggestion under a new guise. But there is a difference between giving the ego the kind of support, based on analytic assessment, which will allow it to begin to test reality for itself in its own style, and the continued force of wholesale indoctrination, which dictates a new pattern of reaction, while actually reinforcing passivity. In practice there must be an infinite number of grades between the two positions, but clarity is obscured by the varying psychiatric disciplines, and by the suspicion that an enthusiast could believe himself to be doing one thing, while he is doing another. This is not to say that the second method is not a perfectly valid approach, suitable to certain cases, provided one admits the mechanisms involved and their limitations. One might see the contrast here as one more example of the general as opposed to the localized approach. It cannot be disputed that certain specific physical and physiological dysfunctions, and perhaps in a less dramatic way certain localized psychological stresses, may exert a critical influence on the behaviour of the whole organism; but the very success of specific treatments may obscure the contrasting fact that each individual modifies and makes use of these common

reactions in his own way. This may be of little or of extreme importance in understanding a case, as well as in validating a new test or treatment.

Most of the treatment labelled "Medium" and "Long" was orientated towards the shortened analysis, with in one long case a swing towards the classical Freudian method, and in some others more than a trace of persuasion. But reviewing the Medium cases, one sees that theory often gave way to practice, and in rather over half the actual treatment did not differ much from the method of Adolph Meyer, with some interpretation of a practical Adlerian kind.

The interplay between the real situation and the internal subjective one cannot be assessed on any rule of thumb. One cannot afford to overlook the cases where, in spite of psychopathology, circumstances are largely decisive, or to assume that an apparently dramatic psychic precipitation is as neat and sudden as it seems. The same caution attaches to approaches from the sociological as opposed to the individual standpoint. The conception of neurosis as a disease of society opened up aspects currently neglected, and it is demonstrable that patterns of unfavourable behaviour accompany bad conditions. Therefore prophylaxis, the favourable alteration of these conditions, remains one of the major hopes of psychiatry. Nevertheless, removing bad conditions, particularly of a material kind, which are easiest to alter, will not inevitably produce a maturation of attitude, nor does the alteration of behaviour due to propaganda necessarily indicate an adult assumption of responsibility. What is still at stake is the responsible acceptance of the change in attitude, morale and understanding.

The examination of group behaviour has led to important new approaches to treatment; but it is an over-simplification to see all maladjustment as social illness, unless one extends the social concept to pre-social levels, i.e. primitive levels of the psyche, where the "objects" are not even fully personal. As with a young child, much testing out and weaning may be necessary before a sick individual can cope with the social situation. Here the group may provide one version of a therapeutic community, which is an extension beyond what the therapist alone can supply. It is sometimes overlooked that in spite of the necessity to form relations, the normal person may also need solitude, or may have to learn to face himself. The individual subjective life still carries a spark which enlivens mass human activities, and underlies convictions and innovations which penetrate society. The individual and the social life are of course complementary, and it is unrealistic to think exclusively in terms of one or the other.

The psychotherapeutic approach in out-patients must depend partly on practical considerations, and this largely individually treated series is presented without any implication that social factors, or the whole battery of group techniques, are dismissed, though in an age of rationalization one might fairly expect some of this pressure to reach psychiatry. In the writer's opinion there is much to recommend individual treatment followed by group treatment, though this is less favourable to research, due to the difficulty of distinguishing the effects of either approach, and the change in the transference situation may be resisted. Two patients of this series had such treatment. The rest were treated individually, with such social help as seemed advisable from the Almoner, though this applied chiefly to "Short" cases.

Saving of time was originally one of the factors encouraging treatment in groups. In spite of the first relief at taking on say, eight new patients in a bunch, a saving is not necessarily made as the group continues in being, and comparison is instructive with the actual time taken here in individual treatments—which however have not overlooked non-medical social clubs.

Apart from strictly interpersonal difficulties, there is often a need to reconcile the patient to the rigidity of modern organization. Modern groupings tend to be large and impersonal, and may precipitate reactions of indifference, suspicion and feelings of impotence. Organizations started to counter these difficulties may themselves ossify, and again produce similar reactions under different guises. The urges which brutalize life in a bare struggle for existence, can still produce destructive tensions under more controlled conditions, with their unavoidable regimentation, barriers to ambition, and emphasis on status, unless there is some understanding of deeper issues and a feeling of common aim; and the neurotic seeing all this in the light of his own internal difficulties tends to be especially vulnerable. Therapy can hardly alter circumstances of this kind, but it can help to short-circuit useless defiance or defeatism. Much of what is called illness of society might be said to resolve itself into problems of distribution, not only of goods and conditions, but of activities, i.e. finding people an adequate share in contribution. But what is fair or reasonable can never be agreed, unless there is some unity on values and aims. All this may seem far from clinical psychiatry, but the therapist is constantly facing this problem, as it is not only a philosophical and political problem but a matter of psychological balance and maturity, and a patient must be helped towards a practical aim and a morale. The background is the constant antithesis between the subjective individual and the mass, be it human or mechanical, with its inexorable momentum.

To return to methods, the attempt to find a way back to shorter treatment, while still preserving analytic insight, brings complexities which might seem of the therapist's own choosing. It must be admitted that there are cases where the therapist, largely by exploiting the positive transference, eases the crisis, and a satisfactory adjustment follows; and such a simple approach was normal in pre-analytic days, though some of its success might have depended on an unconsciousness of the forces involved. In fact no therapist can work for long without some anxiety over deep and apparently destructive transferences, or wondering how far he dare go in supporting a patient, who obviously needs support, but once started seems insatiable. In the face of the secure impersonalness of physical methods and the uncommitted position of the strict analyst, how far dare he go? Admittedly there is a difference between active identification with a patient, which is usually unwise, and more objective sympathy and support; but correctness of theory cannot always satisfy human need.

Short treatments usually entail persuasion of one kind or another, but there is hardly time or opportunity for an intense transference to develop. The difficulty comes with severe cases, needing more prolonged treatment, who, one feels would never start to move, unless they received active support. A rather similar situation is found in attempts to treat psychotics by psychotherapy. The therapist seeks to become a bridge for them to re-establish a hold on reality, and this may depend rather on the patience and insight with which contact is made, and the acceptance of whatever is given, than on any more directly interpretative technique. Accepting the patient's neurosis is not only a tactical move to encourage his own tolerance and to cut down masochistic gains, but also a recognition of the genuine potential diverted there, and of the universality of the problems exposed. It stands to reason that a patient who has entered a regression, has only done so under pressures, with which he could not cope, and therefore anyone who gives support and then tries to link it with reality, may reactivate the original stress, plus the disturbed reactions of that time and their later developments, including primitive dependence and aggression.

Such cases may become tests of endurance, whatever approach is used, as well as tests of our knowledge, and rigidity of technique is no talisman. The giver of support must constantly ask himself what is happening at deeper levels, as well as at the surface. In deep treatment, active support by the therapist may be suited to the patient's maturity, but it risks implying that reality is still bribeable, and the necessary crisis may thus be sidetracked or finally faced with more bitterness and recrimination. Yet in certain cases this could be the better alternative. Deep treatment must imply a certain robustness of the psyche, and the need for support opens a doubt on the patient's fitness.

CONSIDERATION OF RESULTS

Though there were treatments under the same diagnosis of varying length and intensity, it was not felt justifiable to regard them as alternative methods for comparison, except in the way of broad discussion. There are indeed cases which may be better left with as little treatment as possible; but in general there is barely time to give each patient a chance to work through his case sufficiently, and therefore in spite of diagnosis, differences in treatment imply differences in the total situation. Short treatment is confined to those whose trouble is superficial enough, or whose personality is too rigid, or whose symptoms too chronic, to be suited by deeper treatment. As between Long and Medium treatment, the choice is again of the minimum applicable. Given a potentially adjustable personality with valuable qualities, but with an ingrained, long-elaborated disorder, can treatment have any coherence psychologically without time to explore the origins, and for the therapist and patient to work through and through recurring versions of the traumatic situation? Even so, circumstances are often paramount. Of the six Long cases, five were men. This may be chance, but a neurotic with sufficient intelligence and capacity to face a long treatment, and with sufficient standing in his or her job to be allowed latitude for regular attendances, is more often a man. There are some cases it is only right to refer elsewhere for long term analysis; but the wait may be of years, or the list may be completely closed. In these circumstances one can offer support or take them on experimentally, but this usually is not adequate treatment.

It has been noted that the simpler classification makes no distinction in the setting in which symptoms occur. There is of course bound to be every kind of variation, but from the point of view of aetiology, prognosis and treatment, it is important to define whether the state is mainly a reaction to a problem of the present, or secondary to long standing personality difficulties, when it is largely a question of time before sufficient stresses accumulate. The emphasis is on "mainly", because it is difficult to conceive of a case where past personality does not to some extent determine present reactions and even experiences.

In the table below, the classification has been subdivided according to the apparent degree of personality involvement.

- P+ Large personality involvement.
- P± Significant personality involvement.
- P- Reactive factor more prominent.

This assessment is bound to be a generalization and is favourably influenced by such compensations as drive and ability, which may yet give a neurotic considerable power of manœuvre. Such qualities, as well as negative ones, may be indirectly reflected in length of treatment.

Personality	Treatment	Result	Follow Up	Personality	Treatment	Result	Follow Up
ANXIETY STATES: Acute and Subacute							
P	..	I + +	I	P +	..	I + + I + + I + +	I + I I + +
P	M	I + +	I	P -	..	I	I + (preceded by relapse in severe stress)
P	M	I +	I + +	Less severe states or more lightweight personalities	S	I + + I + +	I + ? I + +
P	M & S	I + +	(relapse after twelve months—fair recovery) I + +		S		
P	M & S	I	I +		S	I	No reply—stopped treatment.
HYSTERIA:							
P +	..	I	No reply				
P	M	Broke off					
P	M & S	I + +	Relapse with stress after 15 months.				
P	M & S (with some CO ₂)	I					
P ±	..	I + + I + + I + +	I + + I + + I				
Involutional Cases:							
P +	M & S	I ?	I	Involutional Cases:			
P -	M & S	I ?	I ?	P -	With severe physical handicap	S	I
OBSessional NEUROSIS:							
P +	M	I	No reply				
(Case 3)	L	I +	I				
(Case 6)	L	I ?	Returned to medical treatment.				
P ±	M & S	I + + I + +	Gone away I + +				
(Case 4)	L (with group therapy)	I + +	(Relapse relieved by five sessions—followed up for 3 years) I +	P ±	..	I	I
(Case 5)	L	I +	(writer's cramp unchanged)				
P -	M	I	No reply				
P -	M & S	I	I	P -	..	I.S.Q.	I.S.Q.
CHRONIC ANXIETY STATES: P + and P ±							
R +	M	I +	I + +				
(Case 1)	M	I +	Gone away	R -	..	I + I + I	Gone away No reply I
R +	L	I +	Gone away			I	Gone away
(Case 2)	M	I +	I + +			I	No reply
(Case 2)	M	I	(Broke off)			I.S.Q.?	
(Case 2)	L (with group therapy)	I	I			I.S.Q.	I.S.Q.
R -	M	I	I + (1952)				
Involutional	M	I	I ?				
P -	M & 20 CO ₂	I	I				
R -	Tic I.S.Q.						
Involutional	S	I +	I				
PSYCHOPATHIC PERSONALITY: Emotional instability, mild							
Minor DEPRESSIONS:							
Obsessional personality	M & S	I.S.Q.	I + +				
Reactive	S	I	I				

In chronic cases the personality assessment is hardly adequate, as while nearly all cases come under the P+ designation, there are great variations in the amount of overlay and protective elaboration, and the degree to which the system appears penetrable and potentially reversible, not that the "irreversible" case is necessarily inaccessible to support. These cases have been classified:

R+ Reversible.

R± Partly reversible.

R- Irreversible for practical purposes.

It must be admitted that this assessment depends on the same investigation as the treatment, and therefore cannot stand as an independent finding, and this also applies in a lesser degree to the P assessment.

It will be seen that the acute and subacute anxiety states are favourable conditions to treat, and that the longer treatments have been reserved for cases with less personality weighting. The Short treatments were divided between the acute episodes in predisposed personalities, and the more superficial states.

The giving of longer treatment to hysterics might be questioned. These cases were largely personality disorders, but not of the grossly chronic kind, and appeared capable of some insight. The tendency of many hysterics, with their easy transference, to appear to respond quickly to treatment is notorious, and it was felt that if any impression was to be made, treatment must be in some concentration.

The same distribution of treatment is apparent among the obsessionals, whose tenacity to their pattern is even more ingrained.

With the chronic anxiety states, concentration of treatment has depended more on the apparent "reversibility" and general endowment. As might be expected, the R+ group is the one with better results. Reversibility is likely to go with lesser personality weighting, so that the favourable tendency here, would correspond with the better results in the P± groups among the hysterics and obsessionals.

As a whole there is very little falling off on follow-up from the results obtained on discharge, except in the acuter anxiety states. Here, without trying to explain anything away, it must be remembered that we are dealing largely with higher ratings, where 1+ is still a satisfactory condition, so that variations between 1++ and 1+ may not be very significant, particularly as many people prone to anxiety show a rather quick reaction, which may contain constitutional factors. Another consideration is that in these states Medium treatment at least was continued considerably less long than in the obsessional and chronic anxiety states. Nevertheless, maintenance of improvement, or further progress on follow up, were only rated where there was solid evidence. In fact a change of attitude can start a cumulative process. In the more chronic states the end results are, of course, less successful, but it is remarkable that no case of regression on follow up was recorded among the chronic anxiety states, and only one among the obsessionals, which suggests that psychotherapy of the chronic states, admittedly selected, is worthwhile.

As has been said, the groups receiving the longer and Short treatments are not fully comparable. In the acute anxiety states there is on paper a greater tendency for the Short cases to regress, though this may be partly accounted for by the kind of case selected. Among the obsessionals and chronic anxiety states, maintenance of maximum rating or further improvement only occurs with cases which received longer treatment, though this is only in three cases. In the one obsessional, the writer accepts the result as an effect of treatment,

which was followed up for three years, though as has been noted there was a relapse, and there were certain depressive features. In the chronic anxiety states the two cases were mainly of sexual maladjustment. Both received Medium treatment, but one was fitted with a Loewenstein's splint, which had a marked effect in the resolving of his impotence. These sexual cases very easily accumulate secondary anxiety because of their partner and prevalent attitudes, and there is a correspondingly greater release, if success is attained. There was also one other case, registering a technical improvement at follow up; but it was never felt that his improvement was fully explicable in terms of therapy, and though he showed more tension than depression, it is conceded that he might have been classifiable as an atypical depression. He was followed up for a further two years, by which time he had gone back to about his original level on discharge. The risk of results being unduly boosted by recoveries of disguised depressions has been borne in mind and this case was the only doubtful one. The progress of the three cases was however solid, and may well indicate a trend, similar to the less positive one among the acute anxiety states. Indeed more intensive treatment should give more chance of lasting results; but it is not considered that a conclusion can be drawn from small numbers such as these, complicated by differing severity, involvement and endowment, which in the same case may or may not counterbalance.

LONG CASES

Of the series, six cases were given Long treatment, two chronic anxieties and four obsessional; one of these, a case of ulcerative colitis, was taken on experimentally in view of the apparent connection between the physical state and the onset of much increased obsessional difficulties. As with all cases, a process of elimination also decided the choice of Long treatment: in view of the difficulty and the positive potential of the case, it did not seem reasonable to attempt less. The material question is whether in spite of the difficulties, results justify the time, however short this is in analytical terms, and whether looking back, it is felt that all the treatment was necessary in each case. It is somewhat difficult to be objective about a patient known in so much greater detail. One is more conscious of a journey travelled, but equally of further tracts in view, and with this horizon the immediate result seems a less convincing assessment.

Nevertheless on stability and achievement the results read:

		On Discharge	On Follow-up
Chronic Anxiety Neurosis	1	I++	Gone away
with group therapy	2	I	I
Obsessional Neurosis	3	I	I
with group therapy	4	I++	I++
	5	I+	I+
		but with writer's cramp unchanged	
	6	I?	Returned to medical treatment

There is no doubt that the results in Case 1 were most satisfactory. The patient married and moved away, incidentally from his parents, to take up a responsible job, and was then lost sight of. It is difficult to see how his background and his many capabilities could have been dealt with in a much shorter time. Case 2 was older and more set, for a long time discouraged, and with less drive. He was one of the two Long cases receiving also group treatment. Know-

ledge of his rigidity has caused him to be graded low, though superficially he retained advances he had made, with a definite lowering of anxiety. His was one of the shorter treatments, partly because of the group, and in the light of the results it seems he might have done as well on Medium treatment, followed by group treatment, though he had marked dependent needs, and it was hoped to achieve more.

Of the obsessionals, Case 3 was young and gifted but clearly rigid. Cases 4 and 5 were less strongly obsessional, and compared with 3 had shorter treatment, Case 4 also having treatment in a group. In the writer's opinion the rigidity of Case 3 justified the approach—the treatment could not be full enough. Case 4 showed an increase of insight and capacity, which allowed him to ride a set-back and then make further progress. Case 5 gave up an attitude of depressive indecision and adapted himself to a completely new job, which he made for himself, and at the same time reached a much improved relation with his wife, which had been poor for years. It is on this ground that he was rather doubtfully rated I+, in spite of a writer's cramp which remained largely uninfluenced. It is not felt that treatment could have been reduced in either of these cases without worse results.

The experimental case fell down on a dilemma. It is usually agreed that psychotherapy of an ulcerative colitis cannot be pressed deep because of the weakness of the ego. In this case it was equally difficult to see how the specific ideas of guilt could be influenced without a good deal of probing in the present and past, and it was finally decided that if support were the only course over a long period, she might get this as well from medical treatment which she was having anyway and believed in, whereas she resisted any attempt to change her ideas. As has been said, it was independently noticed that there was an improvement in her attitude, and this had coincided with an improved physical state; but the case was a comparatively mild one, in which a temporary remission would not be unusual. Time could have been saved here, if she had not been considered a research case.

The time given varied from 50 hours over 2 years in Case 3, to 16 hours over 14 months in Case 4, only $8\frac{1}{2}$ of which were individual treatment. Case 2 attended the group for rather shorter, the time being calculated by dividing the total hours by the average number of patients attending.

There is one factor which is important, even if the patient is not directly benefited. A therapist can hardly be expected to keep his senses alert in the middle of continual pressure to save time, unless sometimes he can extend his approach, with fuller investigation and experiment. There should be facilities for enlargement of special experience, as well as contacts outside, to preserve a sense of proportion, and in this conferences are valuable.

These long cases hardly suggest some of the dangers and complications of deep treatment of doubtfully suitable cases under out-patient conditions. In distinction to the six cases described above, five of the six cases which occasioned most uncertainty and difficulty from the time of this paper to the present and were tested for long term treatment, were young women. The case of ulcerative colitis might well also have come into this category if psychotherapy had been pressed.

The only two such cases in the series were referred for in-patient treatment, in one case for long term analysis, in the other, after various physical treatments, for leucotomy, both with poor results. Four outside the series were taken on for out-patient psychotherapy, though two were later tried on physical treatments, largely without success.

These cases were deceptive in first appearances. They were all well below middle age, of reasonable personality, and without severely neurotic past histories, though there had been unfavourable circumstances. They usually presented as tension states with varying hysterical and obsessional features; but they were particularly intolerant of stress, especially the risk of loss of love or security. They were capable of depressive swings of quasi-psychotic intensity, which nevertheless remained influenceable by support. In many ways they could have been called hysterics, but they had a capacity for acute regression, and their symptoms were really polymorphous. In contrast to some other groups, all six showed marked sexual frustration with guilt, and the power of the instinct appeared to act as a catalyst in the regressive process. The transference took on the dependent, demanding ambivalence mentioned earlier, and the frequent oedipal material appeared to screen oral components, which were also apparent elsewhere.

It is of course getting the treatment little further to note that such cases cannot easily be fitted into the crowded out-patient programme. Equally, their apparent potential and capacity for insight made one doubtful of referring them at first for in-patient or physical treatment.

Clearly, before any deep psychotherapy is to be considered, the patient's capacity for rebound has to be assessed, and as has been said a need for support raises the question of the ego's capacity to stand deep analysis. Also the possibility of a developing psychosis must be borne in mind. But there are cases where a psychotic change is latent, and may occur only during treatment. This happened in two of these cases, one while having psychotherapy and one during physical treatment, and it is fair to add that both of these cases had previously seen three or more psychiatrists, without such a condition being suspected. The shift may be pre-ordained, but the method of treatment, analytical or physical, must be re-examined, and this is even more so, if in psychotherapy lack of time and of the availability of the therapist have altered the line of treatment.

These cases are often such that no line of treatment offers an easy prognosis. Therapeutic risks are justifiable but as far as possible should be assessed beforehand. The success of treatments such as leucotomy, in states where a certain penalty is willingly accepted, should not hustle the therapist out of a line of exploration, where with success the penalty might be considerably less. On the other hand, cases could be quoted, where the decision to give up was made years too late. If after full consideration, deep reactive factors still seem more important than endogenous ones, and the patient's contact is still satisfactory, it would seem the reasonable course to try to ensure a permissive environment, in or out of hospital, and to continue the analysis, allowing him to work through the transference. This must take time. Mere admission to hospital does not imply fuller treatment, and in any case it is better continued by the original therapist. Only some young women with a too hostile maternal figure would do better with a woman therapist; but this applies equally from the beginning of treatment.

The point is that the therapist should not be forced to try to work through the dependent demanding stage in at most three half-hour sessions a week, which, however "practical", is likely to heighten the feelings of deprivation. The alternative is for the therapist to be available in emergency for daily sessions, which may be prolonged, and may have to be continued for some months, until it is clear whether the crisis can be worked through. This is asking much, but it is less realistic to start shortened analysis of a difficult case, unless

a much fuller version is available in emergency. Cases of this kind are still pressing material for research, if facilities can be made adequate.

SUMMARY

1. Out-patient psychotherapy under the National Health Service is considered, with special regard to the difficulty of fitting it to the large demand, yet preserving the individuality of the patient.

2. One hundred and forty consecutive cases are reviewed, 80 of whom were available for treatment. Forty-nine (62 per cent.) received psychotherapy alone.

3. The results of psychotherapy on discharge and follow-up after an average interval of 18 months are examined. The figures varied from 83 per cent. much improved or better for the acuter anxiety states, to 33 per cent. much improved in the chronic anxiety states. Of the 49 cases only 7 were not rated "improved".

4. Eighty-nine per cent. of these cases received Medium or Short treatments, which compare in psychiatric time with physical treatments of neurosis, and group therapy.

5. The fact that long term analysis under the National Health Service is not available means the practical abandonment of some cases, and in spite of the small number of long treatments undertaken, the time available may be insufficient. This is particularly so in some emergencies which are not met by ordinary admission to hospital.

BEHAVIOUR PATTERNS IN MENTAL DISORDER

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INTRODUCTION

IN psychiatry, generalization is a process which requires careful handling. It must be firmly rooted in everyday experience of the practical empiricism which gets results, and must be free, as far as possible, from the numerous fallacies which have brought "armchair" philosophizing into disrepute. These are formidable requirements, but fortunately one way of meeting them lies ready to hand. There are doubtless many others apparent to more fertile minds, but the one with which this paper deals rests on the fact that a patient who has been successfully treated by a psychiatrist behaves, when well again, in a different manner from that which he displayed when ill. He is cheerful, not depressed, relaxed, instead of being tense; realistic and socially enterprising as opposed to being autistic. If the term "Behaviour" is used in a sufficiently wide sense, it can cover the great majority of psychiatric phenomena without losing its cardinal virtue for the present purpose, namely that behaviour can be observed and its manifestations measured with considerable accuracy. The products of observation can be handled statistically, thereby avoiding armchair theorizing. Admittedly the interpretation of statistically derived findings presents some difficulty, but this is not insuperable. It is usually easier than the process of generalizing from observed data without the benefit of statistical pre-digestion.

In previous studies (Monro, 1954, 1955) I made preliminary essays in the use of this technique of generalization in the psychiatric field. Those works, in their turn, derived from the work of such men as Allport (1937), Burt (1940), Cattell (1946), Eysenck (1947), Kretschmer (1921), Stephenson (1952), and important germinal ideas were provided by Professor J. Drever of Edinburgh University. Briefly, my former studies attempted to describe the behaviour of mentally disordered people in terms of traits, and to explore the relationships between these traits as actually observed in a sample population of 200 patients, carefully chosen to be as representative as possible of the disordered population of the country as a whole. In the first paper R-Technique was used and 35 correlation clusters, or compound traits, were derived from the data. In addition, a relatively rapid and accurate method of rating patients for these 35 compound traits on a 5-point scale, was described. These 35 compound traits were considered to be descriptive elements relating to a wider area of behaviour than that denoted by the simple traits from which they were derived, but not yet relating to as wide an area as that involved in the major psychiatric syndromes. The compound traits, therefore, were not regarded as equivalent to psychiatric syndromes, but rather as the descriptive bricks from which psychiatric diagnoses could be built up. The actual development of this theme forms the subject of this paper.

The second study referred to above used Q-Technique, and yielded 13 Types. It is referred to here because these types, with certain exceptions, did not correspond to the syndromes described by clinical psychiatry, but rather to the basic personality types encountered among the mentally ill. Also, the results of this Q-Technique study have some relevance to the findings presented in this paper.

SCOPE AND TECHNIQUE OF THE ENQUIRY

The question chosen for study was the relationships which might be found to exist in the mentally disordered between the 35 compound traits referred to above. Two alternatives presented themselves:

- (a) Factorial analysis of the data already accumulated;
- (b) A further R-Technique study of the correlations between the 35 compound traits.

The latter was chosen, as it was felt to have priority over the former. Cattell's (1946) argument was accepted, to the effect that correlation-cluster studies yield descriptive elements rather than interpretative formulations, while factorial analyses do the reverse. It is sound scientific method to make description as complete as possible before proceeding to interpretation, and my 1954 study clearly left the descriptive process only partially developed. That enquiry started from Cattell's description of a trait as a collection of reactions or responses bound together by some kind of unity which enables them to be dealt with under one term, for most purposes. It next accepted Cattell's (1946) contention that co-variation is the basis of unity. From these considerations it follows that correlation-clusters or compound traits are devices for economizing terms in the description of behaviour. They retain unity, which is the essence of a trait, because the constituent simple traits intercorrelate positively to a significant degree. That is simply to say that they appear and disappear together. As an example, it is obviously more economical, and just as accurate in trained circles, to describe a patient as depressed, as to elaborate that he is miserable, retarded, pessimistic and given to rumination on painful topics. My 1954 paper brought this economizing process to the point of describing behaviour in terms of 35 variables, the compound traits already referred to. The next obvious step appeared to be to discover the intercorrelations, if any, between them. It also seemed wise to repeat this process, if possible, until the correlations became so low that the unity of the resulting compound traits was suspect. This process held out the promise of demonstrating the extent to which descriptive generalization could be pushed without becoming so subject to qualification as to be meaningless.

The data which are elaborated here were provided in raw form by these previous enquiries. The sample population had actually been rated for the 246 simple variables, and the process checked for accuracy by rating a proportion of them in collaboration with colleagues. The correlation between our results was of the order of plus 0.850. To save reference back to the earlier works, the composition of the sample in terms of psychiatric diagnoses is set out in Table I below.

TABLE I
Composition of the Sample Rated

	Women	Men	Total
Schizophrenia	9	10	19
Manic-Depressive	21	17	38
Paranoid	3	3	6
Involuntional	3	1	4
Schizo-Affective	7	5	12
Anxiety States	18	13	31
Hysteria	18	13	31
Neurotic Depression	15	10	25
Obsessionals	3	2	5
Miscellaneous	17	12	29
	<u>114</u>	<u>86</u>	<u>200</u>

TABLE II

Product-Moment Correlation Coefficients Between the 35 Compound Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1		+670	+613	+049	-085	-557	-504	-159	-500	-331	-569	+399
2			+578	+070	-122	-279	-323	-164	-627	-400	-491	+408
3				+347	+461	+049	-312	+057	-345	-341	-547	+346
4					+520	+764	+345	+208	+121	-018	-081	-339
5						+524	+517	+425	+320	+190	+134	-377
6							+577	+317	+272	+224	+141	-271
7								+382	+555	+501	+456	-583
8									+394	+270	+155	-203
9										+468	+589	-476
10											+247	-460
11												-376
	13	14	15	16	17	18	19	20	21	22	23	24
1	+254	+314	+220	+189	+312	+364	+262	-225	-325	-483	-268	-438
2	+537	+125	+150	+097	+244	+092	+411	+197	-397	-475	-346	-222
3	+365	+062	+253	+402	+424	+331	+331	+490	-424	-602	-149	-299
4	-060	-020	+072	+119	+305	+258	+059	+246	-113	-127	+272	-267
5	-110	+023	+143	+130	+288	+177	+038	+209	-048	+004	+380	-220
6	-100	+071	+006	-005	+056	+121	+079	-055	+324	+255	+503	-113
7	-322	-058	-071	-001	-006	+086	-278	-121	+408	+422	+527	+041
8	-111	-135	+018	+056	+064	+085	-205	+073	+039	+018	+331	+098
9	-123	-366	-156	-036	-084	-093	-082	-126	+167	+389	+345	+301
10	-324	-002	-004	-003	-048	+056	-043	+041	+657	+532	+446	+170
11	-274	-276	-121	-123	-280	-243	-136	-312	+306	+500	+195	+422
12	+530	+099	+026	+140	-106	-100	+160	-031	-571	-496	-539	-060
13		-057	-099	-139	-136	-042	+149	+016	-523	-448	-458	+195
14			+310	-117	-060	+248	+235	+069	-008	+041	+096	-296
15				+006	+454	+347	+345	+148	-123	-033	+105	-454
16					+595	+430	-095	+418	+259	-068	+312	-403
17						+362	+121	+381	-200	-184	+068	-586
18							+154	+329	-069	+171	+172	-409
19								-076	-215	-094	-132	-099
20									-281	-284	-018	-377
21										+706	+542	+058
22											+424	+210
23												-138
	25	26	27	28	29	30	31	32	33	34	35	
1	-410	+110	+218	-262	-496	+213	-015	-481	-282	-531	+618	
2	-250	+283	-027	-290	-127	-371	-264	-165	-295	-412	+310	
3	-310	+144	-330	-518	-304	-002	-398	-443	-449	-594	+326	
4	-032	-355	-454	-334	-050	-457	-102	-332	-175	-204	-592	
5	-040	-507	-547	-526	+153	-331	-180	-136	-111	-076	-408	
6	+238	-509	-591	-299	+190	-302	+146	+116	+161	+182	-390	
7	+346	-559	-424	-146	+281	-330	+125	+236	+281	+425	-523	
8	-001	-059	-387	-259	+099	-198	-134	-180	-041	-031	-269	
9	+496	-218	-088	+127	+074	-470	+103	+245	+202	+355	-474	
10	+216	-265	-307	+174	-037	-088	+162	+132	+241	+331	+348	
11	+488	-672	+197	+276	+236	-231	+323	+375	+289	+516	-463	
12	-237	+475	+296	-050	-142	+380	-129	-202	-428	-563	+468	
13	-054	+269	+024	-045	-264	-445	-153	-230	-402	-572	+244	
14	-290	-031	-188	-073	+090	+080	-076	+052	+197	+112	+170	
15	-167	-063	-293	+253	-027	+062	-407	-476	-034	+295	-814	
16	-159	-191	-576	-446	+175	-082	-210	-133	-068	-267	-031	
17	+266	-291	-480	-440	-098	+027	-136	-231	-171	-146	+005	
18	-254	-091	-131	-234	-071	-104	-155	-076	+070	-154	+024	
19	-001	+029	-197	-122	-117	-019	+078	-246	+094	-123	+121	
20	-265	-158	-527	-359	-186	-168	-495	-120	-275	-244	+095	
21	+347	0	-266	-168	0	-164	+310	+301	+765	+573	-203	
22	+397	-144	-035	+341	+198	-115	+358	+388	+538	+680	-284	
23	+125	-306	-408	-128	+179	-228	+046	+114	+447	+471	-247	
24	+427	+163	+328	+391	-012	-141	+174	+225	-005	+150	-249	
25		-080	+019	+326	+049	-221	+719	+157	+059	+198	-354	
26			+476	+406	-463	+084	+072	+049	-262	-253	+297	
27				+215	+015	+370	+191	+162	-095	+025	+042	
28					-140	-065	+344	+378	+212	+279	+008	
29						+085	-004	+129	+077	+354	+355	
30							+024	-083	-433	-157	+073	
31								+065	+226	+246	-069	
32									+436	+496	+089	
33										+608	-060	
34											-374	
35												

The next step was to convert the rating for the 246 simple traits into a score on a 5-point scale for the 35 compound variables, by the punched card technique described in detail already (Monro, 1953). Then the product-moment correlation coefficient between each compound variable and every other compound variable was determined, and the results set forth in the usual tabular form, in Table II.

Next, using the technique for deriving trait-groups described earlier (Monro, 1954), the groups formed by positive intercorrelation between the 35 variables were determined. In the first place, a standard of positive intercorrelation of at least 0.500 was required, but it was found impossible to demand this level between each and every variable forming the new groups. However, each variable included in the new groups correlated positively to the extent of 0.500 with at least one other variable in the group, with the exceptions of Groups V and VI where the level required was reduced to plus 0.400 or above.

The number of new groups was found to be twelve. The process of intercorrelation described above for the 35 trait-groups was then repeated between these twelve, and the results set out in tabular form—in Table III.

TABLE III

Product-Moment Correlation Coefficients Between the 12 Newly Derived Syndromes

1	2	3	4	5	6	7	8	9	10	11	12
1	+254	+439	-631	-116	+004	+017	0	-109	-095	+019	-152
2		+243	-380	+136	-509	+387	-022	-100	+023	+215	-416
3			-587	-400	+239	+107	-383	-353	-153	+088	-318
4				-399	+010	-189	+190	+082	-076	-349	+214
5					-374	+116	+160	+068	-043	-156	-147
6						-318	-105	-370	+072	-133	+184
7							-135	+018	-205	+099	-198
8								+310	+235	+090	+080
9									+345	-027	+062
10										-117	-019
11											+085
12											

In this phase, the correlation coefficients were found to be much lower. The highest was plus 0.439, and groups could only be formed by accepting positive correlations above the level of 0.200. In this way, five groups were finally derived.

CONSIDERATION OF THE RESULTS

The twelve trait-groups derived from the intercorrelation of the 35 compound variables were constituted as set out below. To save space, the compound variables will be denoted by the initials "CV", followed where necessary by a number to indicate its place in the list previously published (Monro, 1954).

Group I, composed of CV's 21, 33, 22, 23, 34, 10 and 32, consisted of the following simple traits:

Hostile, pugnacious, vindictive, slanderous, suspicious, irritable, opinionated, partial, jealous, defensive, obstructive, ungrateful, mulish, tactless, cynical, sarcastic, assertive, argumentative, arrogant, conceited, evasive, extrapunitive, plaintive, egotistical, self-deceiving, deceitful, dishonest, disloyal, acquisitive, ruthless, hard, cruel, rebellious, selfish, tight-fisted, dissatisfied, cold and cowardly.

Group II, composed of CV's 4, 5, 6 and 7, consisted of the following simple traits:

Hearty, optimistic, cheerful, genial, self-confident, vivacious, mirthful, unrepining, enthusiastic, charming, energetic, contented, generous, adaptable,

gregarious, curious, frivolous, talkative, boastful, intrusive, hurried, emotionally expressive, impulsive, reckless, mischievous.

Group III, composed of CV's 25, 31, 9, 11 and 24, consisted of the following simple traits:

Coarse, rough, slipshod, confused, forgetful, disordered in thought, phantasying, absent-minded, irresponsible, lax, careless with goods, wandering, conscienceless, easy-going, placid, casual, fickle, undependable, quitting, planless, banal, unintelligent, shiftless and narrow in interests.

Group IV, composed of CV's 1, 2, 3, 35, 12 and 13, consisted of the following simple traits:

Conscientious, responsible, painstaking, reliable, persevering, self-respecting, cautious, serious-minded, deliberate, formal, fair-minded, thrifty, patient, loyal, honest, self-denying, kind, soft-hearted, unresentful, co-operative, reasonable, grateful, natural, tactful, praiseful, affectionate, friendly, frank, inhibited, habit-bound, inflexible, conventional, self-distrusting, self-dissatisfied, submissive, peaceable, gentle-tempered, humble, trustful, tolerant, naïve and unambitious.

Group V, composed of CV's 16, 17, 20 and 18, consisted of the following simple traits:

Hard-headed, shrewd, enterprising, tough, independent, ambitious, decisive, planful, individualistic, worldly, wide in interests, leading, versatile, sociable, and with social interests, polished, alert, poised, clear-thinking, logical, self-controlled, modest, witty, thoughtful, having mathematical and verbal aptitude, and technical and theoretical interests as well as originality.

Group VI, composed of CV's 26, 27 and 28, consisted of the following simple traits:

Reserved, taciturn, quiet, shy, self-effacing, listless, inactive, leisurely, humourless, mirthless, cold-hearted, self-sufficient, secretive, unenquiring, awkward.

Group VII, composed of CV 8 only, consisted of the following simple traits:

Amorous, erotic, sensual.

The remainder were also composed of single CV's and were constituted as follows:

Group VIII, CV 14. Fastidious, faddy, pernickety, pedantic.

Group IX, CV 15. Imaginative, with musical and drawing ability, and musical, aesthetic and artistic interests.

Group X, CV 19. Pious, reverent, having religious interests, mystical, idealistic, humanitarian, good-tempered.

Group XI, CV 29. Affected, eager for attention, self-pitying.

Group XII, CV 30. Brooding, gloomy, pessimistic, worrying.

These groups appeared to relate to a sufficiently wide area of behaviour to merit the term "Syndrome" and were given provisional titles as follows:

1. The Anti-Social Syndrome.
2. The Syndrome of Inadequately Controlled Surgency.
3. The Syndrome of Mental Deterioration, Deficiency and Inadequacy.
4. The Syndrome of Emotionally Constricted Extraversion.
5. The Syndrome of Tough, Capable Extraversion.
6. The Syndrome of Introversion and Social Withdrawal.
7. The Amorous, Erotic Syndrome.
8. The Cranky Syndrome.
9. The Imaginative, Aesthetic Syndrome.
10. The Syndrome of Interest in Religion.

11. The Hysterical Syndrome.

12. The Syndrome of Anxious Depression.

In certain cases, interesting considerations regarding the relationships between these twelve syndromes were afforded by a study of the positive correlations between CV's in different syndromes. These were all less than 0.500, but were nevertheless substantial.

There was a link between the anti-social syndrome and mental deterioration, and also between its hostile, pugnacious, jealous aspect and surgency. There was also a relationship between the forceful verbal expression of surgency and the verbal expression of anti-social attitudes and feelings.

The Syndrome of Emotionally Constricted Extraversion had links with religious interests and practice, and also with Tough, Capable Extraversion. Its more dependent aspects were related to the reserve and social withdrawal of the Sixth Syndrome. The Hysterical Syndrome showed a relationship on the one hand with CV's 34 and 35, and on the other with CV's 7 and 11. This suggests that the hysterical syndrome may have two principal forms, or may occur in two main settings; firstly, with emotional inhibition, plaintiveness and extrapunitive tendencies; and secondly, associated with lability, impulsiveness and casual, undependable ways.

The Syndrome of Anxious Depression had relationships with a conventional, self-distrusting outlook, and with general under-activity.

Although the Syndrome of Introversion and Social Withdrawal had no subsidiary relationships of this kind, its inner structure was interesting. Of its 3 constituent CV's 26 correlates adequately with 27 and 28, but the two latter show a considerably lower positive intercorrelation. This possibly indicates that there are two somewhat distinct aspects of the syndrome, the one relating to depressive under-activity, the other being schizoid in character.

In an attempt to interpret these findings further in a tentative fashion, recourse was had to a comparison with the work of Cattell (1946, 1953) on a normal population. The rating scale from which this enquiry developed was based on Cattell's comprehensive scale, and a comparison of the results at the correlation-cluster stage of development was considered scientifically justifiable by Professor Drever of Edinburgh University (Monro, 1953). Such exact comparison at this further stage of development is not possible, as Cattell proceeded from the correlation-cluster stage to a factor analysis, whereas I have gone on to explore the correlations between correlation clusters. The comparison undertaken here is therefore of necessity limited to a search for fruitful interpretative suggestions.

Cattell (1953, pp. 185 *et seq.*) gave lists of traits which he considered most characteristic of the 14 bipolar factors he derived from his researches. I compared the lists of traits comprising the twelve syndromes described above with Cattell's lists. Where more than half the traits in one of Cattell's lists were found in a particular syndrome, a major relationship, for the present purpose only, was considered to exist between the appropriate pole of Cattell's factor and that syndrome. Where less than half, but more than a quarter of the traits corresponded in this way, a minor relationship was considered to exist. The actual relationships found were as follows:

Syndrome I showed major relationships with schizothyme frustration, an obstructive withdrawn schizothyme temperament and paranoia. Its minor relationships were with demoralized general emotionality, boorishness, a dominant disposition and tough, rigid, poise.

Syndrome II very strongly resembled Cattell's factor of surgency, and had

major relationships with charitable, adventurous cyclothymia and hypersensitive, infantile, sthenic emotionality. Its minor relationships were with a dominant disposition, an outgoing temperament and demoralized general emotionality.

Syndrome III related principally to low intelligence and immature dependency, with minor relationships to boorishness and neurasthenia.

Syndrome IV had the most complex relationships of all, perhaps because it is at the point of overlap of several factors. Its major relationships were with a phlegmatic, frustration-tolerant temperament, a submissive disposition, positive character-integration, charitable adventurous cyclothymia, and cyclothymia *per se*. Its minor relationships were with an emotionally stable character, intelligence, a trained, socialized, cultured mind, a vigorous obsessional determined character, an outgoing temperament and anxious practicality.

Syndrome V related principally to an emotionally stable character, a trained, socialized, cultured mind and intelligence. Its minor links were with a dominant disposition, positive character integration and an obsessional determined character.

Syndrome VI related principally to melancholic desurgency, and secondarily to an obstructive, withdrawn, schizothymic temperament.

Syndromes VII to X had no relationships at all.

Syndrome XI had a dubious connection with hypersensitive, infantile, sthenic emotionality, and *Syndrome XII* had a minor relationship with melancholic desurgency.

Broadly speaking, these findings accorded reasonably well with the provisional titles suggested for the twelve syndromes. The relationships of Syndrome VI tended to confirm the finding noted earlier that this syndrome seems to have a depressive and a schizoid facet.

The results of the intercorrelations between the twelve syndromes themselves must be treated extremely tentatively owing to the low level of the correlations. The syndromes of anti-social behaviour, mental deterioration and introversive social withdrawal coalesced to form a loose group. The surgent syndrome likewise formed a general association with hysteria and amatory activity. The Syndrome of emotionally constricted extraversion formed a similar group with anxious depression, and the syndromes concerned with religion and aesthetic interests tended to combine with fastidiousness. Syndrome V, that of tough, capable extraversion, remained unchanged.

Very broadly, the first of these groups seems to denote disorder associated with disintegration of the social capacities, while the second appears to describe illnesses in which social activities and drives persist, but in a distorted form. The third indicates a general relationship between illnesses characterized by depression, anxiety and obsessional tendencies. The fourth group may well relate to an aspect of the capacity for regaining mental health. In this connection Bychowski (1950) points out that, in the treatment of patients with egoic weakness, it is often necessary to help the patient to arrive at a philosophy of life, which may often take the form of allegiance to a traditional body of religious doctrine. He further points out the value in these cases of aesthetic interests and activities, a finding borne out by many clinicians with experience of art or musical therapy. The fifth group relates much more clearly to the potential capacity for recovery. It bears a close resemblance to the qualities described by Barron (1953) as characteristic both of ego-strength and the capacity to respond to psychotherapy.

This enquiry, therefore, arrives at certain broad, tentative generalizations

about the patterns of behaviour shown by the mentally ill. The first of these appears to be the disintegration of socially adjustive behaviour, in which anti-social attitudes and withdrawal from social contacts are conspicuous. The second seems to be characterized by the continuation of attempts to make social contacts, but in a distorted and unrealistic way. The keynote of the third appears to be affective disturbance. The other two patterns denote the presence of the capacity for recovery, even in a population of seriously disordered patients.

DISCUSSION

This enquiry is an attempt to apply recently developed precision methods to practical problems of psychiatric classification and generalization. The particular technique used is one designed to reveal broad perspectives rather than points of detail; it is analogous to the use of low power microscopy in studying the main features of tissue structure. It has the limitation of being purely cross-sectional, whereas in clinical psychiatry it is essential to know the speed of development of an illness, the circumstances in which it arises and the kind of person in whom it occurs.

It is therefore interesting, perhaps even remarkable, that the findings in this paper should so closely reproduce the principal syndromes described by clinical psychiatry. It is true that Syndrome I above is somewhat broader and more inclusive than the paranoid syndrome, as it includes many schizophrenic features and also certain aspects of aggressive psychopathy, but these relationships are well recognized clinically. Syndrome II does not distinguish between clinically distinct manifestations of surgency, such as mania, schizo-affective states and schizophrenic excitement, nor does Syndrome III differentiate mental deterioration from mental deficiency or certain forms of personality inadequacy. Syndrome IV includes the characteristics of the obsessional in a rather wider setting which seems to embrace the personality characteristics in which such states may arise, while Syndrome XII does not separate anxious depression into its clinically distinct categories. Nevertheless the general picture of the psychiatric scene is eminently recognizable and familiar. To revert to the analogy of microscopy, this study is using a slightly lower power than clinical observation.

It is worth noting, however, that this relative lack of the power to discriminate detail was not shown in my previous Q-Technique study (Monro, 1955). This separated out the paranoid type more exactly, though it included individuals of the paranoid temperament who sought psychiatric advice on account of anxiety. It also differentiated sharply between mania and schizophrenic excitement, while also giving some indication of the validity of the schizo-affective category. There was also a much clearer differentiation between mental deterioration and deficiency. Q-Technique did not bring out the obsessional type as clearly as clinical psychiatry has done, but Type 9 in the former paper has strong affinities with it in a depressive setting. Certain anxiety manifestations were also clearly differentiated from a variety of depressive conditions.

This is further evidence of the useful complementary functions of R- and Q-Techniques. Between them they mirror the clinical scene with remarkable accuracy. It is not yet clear why the two methods should produce these different but complementary results, but these findings give a useful warning of the unwisdom of predicting what a particular statistical tool will accomplish in a field as difficult and complex as clinical psychiatry. It seems that the best way

to find this out is to use the tool, and scrutinize the results in the light of all available knowledge derived from other sources.

Another point of some interest is the sharp drop in the level of the positive correlations when the twelve syndromes described above were intercorrelated. This suggests a profound, though perhaps unwitting agreement between the findings of trait-psychology and clinical psychiatry. Trait-psychology, as used in this enquiry, is concerned with the problem of dealing with the varied manifestations of behaviour in unitary terms, particularly for descriptive purposes. Starting from unitary terms which describe relatively narrow aspects of behaviour, it seeks by the technique of correlation to subsume wider and more varied aspects under single heads. This enquiry has shown the process to be justifiable until areas of behaviour of similar breadth to those embraced by the classical syndromes of psychiatry are reached. The drop after that indicates that the unity underlying yet wider generalizations has become, at best, tenuous. Historically speaking, clinical psychiatry has followed a very similar path. Whether searching for "Disease-Entities", "Reaction Types" or "Diagnostic Categories", it has, in fact, aimed at describing wide areas of behaviour (usually behaviour characteristic of mental disorder) in unitary terms. The term "Mania" is clearly intended to denote a particular set of behavioural manifestations, and to suggest that, with due qualifications, all cases of mania require to be handled and treated in the same sort of way. That clinical psychiatry and trait-psychology agree so closely regarding the width of the areas of behaviour that can be dealt with in unitary terms, is a fact of considerable significance.

These considerations suggest a re-valuation of the critical attitude of clinical psychologists towards psychiatric classification. Eysenck (1952) said that, in statistical terms, the reliability of psychiatric diagnoses is seldom or never above 0.500. He called Kelly's Michigan Study "A devastating comment on, and criticism of the clinical methods of interviewing". Ash (1949) showed that diagnostic agreement may only be reached on 30-40 per cent. of occasions by psychiatrists working under controlled conditions. These contentions require to be taken seriously, but suggest a very different state of affairs to that indicated in this paper. If clinical psychologists go beyond a simple statement of the statistical deficiencies of psychiatrists, and suggest that their own statistical tools can make a better job of psychiatric classification, they would be wise to reflect on the difficulty mentioned above, of forecasting what a particular statistical tool will do in the psychiatric field. Even in the matter of psychiatrists falling short of the requirements of statistics, there are various pertinent considerations. It may well be that the criteria evolved by clinical psychologists have more relevance to the fields of research, vocational guidance, etc., than to the domain of therapy, which is the psychiatrist's principal interest. It is true that psychiatric diagnosis is not standardized; some psychiatrists prefer to be baldly descriptive, others prefer to be interpretative to some degree in their diagnoses. Disagreement, sometimes more apparent than real, may also occur between exponents of different schools. These facts require to be taken into account in order to arrive at the real degree of unreliability of psychiatric diagnosis and of the amount of genuine disagreement between psychiatrists. There is a case for attacking the difficulties of psychiatric classification with precision methods and working towards greater standardization of diagnostic categories, but this paper suggests that clinical psychiatry has done a better job than it is sometimes credited with. There is, beyond all doubt, scope for collaboration between psychiatrists and psychologists, but there must be full respect for each viewpoint.

This discussion can fittingly be ended with a brief consideration of the five broad generalizations evolved above. It is interesting to note that two of the three which denote disordered behaviour patterns lend themselves most easily to formulation in terms of social adaptation, thereby emphasizing the importance of social factors in psychiatry. Finally, the clear emergence of a category resembling ego-strength as described by Barron (1953) is significant. If this concept, derived from a statistical-behaviourist approach, is compared with Bychowski's (1950), derived from psychotherapeutic experience, the implications become even wider. The latter author regards egoic weakness as consisting of a failure of the main functions of the ego, namely, mastery of and adaptation to external and internal reality. The failure of social adaptation shown in two of the broad categories mentioned above suggests a relationship to egoic weakness so conceived. The element of emotional constriction in the third category may relate to some degree of difficulty in dealing with internal reality, and so to egoic weakness. The concept of egoic weakness is thus one with wide ramifications in relation to mental disorder and its further study might well be repaying. Certainly mental hospital psychiatrists are constantly meeting the difficulty of trying to help people whose personalities are so poor that there seems little prospect of success. The fact that some capacity for recovery was so clearly revealed in a sample population of the mentally disordered, gives some ground for hope that, with further study, it may prove possible to cope more successfully with this problem.

SUMMARY

1. After an introductory discussion on the problem of generalization in psychiatry, the sample population dealt with was described.

2. Next, the process of scoring this sample on a 5 point scale for 35 variables (compound traits) was described.

3. The product-moment correlation co-efficient between each variable and every other variable was determined, and the results set out in tabular form.

4. From these data, in accordance with the correlations, twelve groups of variables, or Syndromes, were derived and given provisional titles.

5. Further relationships between these syndromes were explored in the light of positive correlations between variables falling in different syndromes.

6. The intercorrelations between the twelve syndromes were determined, and five broad categories or generalizations derived from them. It was noted that, at this stage, the level of positive correlations had fallen to a relatively low level.

7. To assist in the interpretation of the twelve syndromes, a comparison was carried out between the findings summarized above, and the factors derived by Cattell from his researches on normal populations.

8. A very tentative interpretation of the five broad categories was put forward.

9. In discussing these results, attention was drawn to the difficulty of predicting what a particular statistical tool will accomplish in the psychiatric field, and the possible complementary functions of R- and Q-Technique were noted. Attention was paid to statistically grounded criticisms of psychiatric classification, and the need for caution and further investigation stressed. Finally, the possible importance of the concept of egoic weakness in relation to the behaviour of the mentally disordered, was noted.

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FAMILY SETTING AND THE URBAN DISTRIBUTION OF SCHIZOPHRENIA

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A NUMBER of studies have shown that the incidence of schizophrenic illness (as measured by first admissions to mental hospitals) is high in the central areas of large cities and diminishes progressively towards the suburbs (Faris and Dunham, 1939; Dunham, 1947; Hare, 1956). Two main hypotheses have been advanced to account for this distribution. The first, the "breeder" hypothesis, is that social factors in the central areas are causal for schizophrenia and the particular factor most likely to be responsible is that loosely called "social isolation". The second, the "attraction" hypothesis, is that the social disorganization or anonymity characteristic of the central areas attracts unstable and schizoid persons, either because such persons are unable to maintain themselves in better areas or because they wish to avoid the intimate personal relations of family life.

In an attempt to evaluate the role of certain social factors in schizophrenia, Gerard and Houston (1953) studied the family setting and residential stability of 305 male schizophrenics admitted to the State Hospital from the city of Worcester, Massachusetts. They found that, when all the schizophrenic cases were considered together, their distribution throughout the city corresponded with that found in previous studies. However, when they considered only those cases who, at the time of their admission, were living with their families the distribution was quite random; on the other hand, the great majority of the cases who were living alone or away from their families came from the central areas and, in contrast to those from a family setting, showed marked residential instability. The authors concluded that their findings support the second of the hypotheses mentioned above and that the excess of schizophrenic illness found in the central areas of large cities is principally due to the fact that schizoid individuals seek to protect themselves from close personal relations by moving away from their families to the lodging-house areas and, in addition, by frequently moving from one lodging to another. They did not, however, show that the schizophrenics living out of family setting had in fact been schizoid nor that these patients had in fact moved away from their families by choice.

The present study was an attempt to determine (a) whether the findings of Gerard and Houston on the relation between urban distribution and family setting of schizophrenics could be confirmed in an English city and for both sexes; and, if so, then (b) whether a similar relation held for cases of manic-depressive psychosis and (c) whether, from a study of the personalities and histories of the schizophrenics living out of family setting, further evidence could be found to assess the relative importance of the "breeder" and the "attraction" hypotheses.

METHOD

Case Data. In a general survey of mental illness in the city of Bristol (Hare, 1956), 472 cases of schizophrenia and 1,052 cases of manic-depressive psychosis were found to have been admitted to mental hospitals for the first time during a five-year period, 1949–1953. In the present investigation, however, it proved impracticable to obtain the necessary information about privately treated cases, so that this study is based on 466 schizophrenics and 998 manic-depressives admitted to the Bristol Mental Hospital. These numbers included only those cases admitted from private dwellings; cases that had been admitted from hostels or had been resident in institutions for more than a month before admission were excluded. This is a point of importance as most hostels are in the central areas of the city, but patients admitted from them commonly had no fixed abode and often had come to Bristol only a few days before their admission.

The diagnosis, address and family setting at the time of admission were obtained from the case records. The diagnosis of "schizophrenia" was taken to include schizo-affective disorder, paraphrenia and paranoid state; "manic-depressive psychosis" included involuntional melancholia and unspecified depression but excluded reactive depression. The classification of family setting was the same as that used by Gerard and Houston, viz. (a) "in family setting": those living with parents, spouses, siblings or children, and (b) "out of family setting": those living alone or away from any of their relatives. Not every case could be satisfactorily classified in this way, either because of inadequate information or because the patient had only just or only temporarily left his relatives or had been in Bristol less than a week; these cases, which numbered 25 (5 per cent.) of the 466 schizophrenics and 5 (2 per cent.) of the 318 manic-depressives examined, have been excluded from the results.

Social Data. The survey of mental illness mentioned above had shown that, for all cases of schizophrenia, the ward rates were highest in the central areas of Bristol and showed a very significant correlation with the proportion of single-person households*; the schizophrenia rates showed no significant correlation with the mean rateable value of private dwellings nor with population density. Accordingly, in comparing the schizophrenia rates with the social conditions in the wards, the index used in the present study has been the proportion of single-person households and not that of "favourability of living" as used by Gerard and Houston.

Case Rates. All case rates have been adjusted for differences in age and sex distribution of the population at risk. Ward populations by age and sex were based on figures from a 10 per cent. sample of the 1951 census returns.

RESULTS

Ward Distribution of Schizophrenic Cases

The numbers of schizophrenic cases in and out of family setting found throughout the city were:

	Males	Females
In family setting	180	197
Out of family setting	24	40

* This proportion is the number of single-person households expressed as a percentage of all private households in the ward. In effect, it is a measure of the number of people living alone. For the definition of single-person household, see Registrar-General (1952).

Among those cases in family setting there was a slight tendency for higher rates in the central wards but the total distribution did not depart significantly from random ($\chi^2=34.4$, d.f.=27, $P>0.1$); nor was there any significant correlation between the ward rates and the proportion of single-person households ($r=0.28$, $n=28$, $P>0.1$). The cases out of family setting, however, showed a marked concentration in the central wards and a very significant degree of correlation with the proportion of single-person households (excluding one central ward because of its disproportionately high rate, $r=0.88$, $p<0.001$). The association between ward rates for schizophrenics out of family setting and the proportion of single-person households is shown in the dot-diagram (Fig. 1).

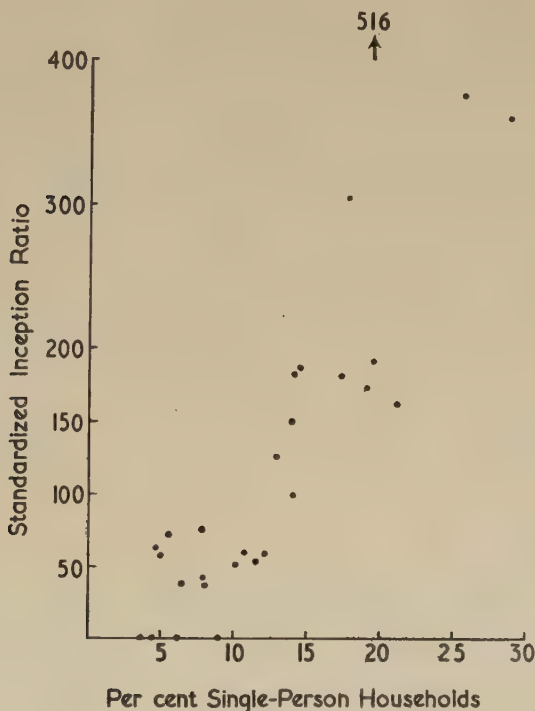


FIG. 1.—Relation between rates for schizophrenic cases out of family setting and the proportion of single-person households, by wards.

Distribution of Schizophrenic and Manic-depressive Cases Among Three Groups of Wards

As the actual number of cases per ward out of family setting is very small (64 schizophrenics in 28 wards), the above results may be checked by determining the distribution in another way, using groups of wards. Three groups, each comprised of five wards, were selected on the criteria (a) that four wards, notably heterogeneous as regards social characteristics, were excluded and (b) that of the remaining wards, Group A contained those of the highest mean rateable value of private dwellings, Group B those of the lowest mean rateable value and Group C those with the highest proportion of council houses. These areas contain 14.2 per cent., 11.3 per cent. and 26.6 per cent. respectively of the city's population and may roughly be taken as representing the "good"

(or "desirable") central area, the "poor" central area and the housing estate areas which are all on the periphery of the city.

The observed and expected numbers of schizophrenic cases in these ward groups were:

		Group A	Group B	Group C	Sum
In family setting:	Observed	51	48	88	187
	Expected	51.3	42.5	101.0	
Out of family setting:	Observed	26	16	3	45
	Expected	11.2	8.1	16.4	
Proportion of cases out of family setting (percentage):					
		34	25	3	19.4

For the schizophrenics in family setting, the observed numbers do not differ significantly from those expected on a random distribution (adjusted for age and sex), but for schizophrenics living out of family setting, there is a marked excess in the central ward groups ($\chi^2=38.1$, $p<0.001$). The proportion of single-person households in the groups was 20.0 per cent., 14.0 per cent. and 5.0 per cent. respectively (city average 11.3 per cent.) and it is evident that there is a fairly close association between these proportions and the proportions of schizophrenics out of family setting.

The family setting of manic-depressive cases in the three ward groups was estimated by determining that of all the male cases (158) and a one-in-two sample of the female cases (177 out of 356). This gave:

		Group A	Group B	Group C	Sum
In family setting		150	105	198	453
Out of family setting		33	10	16	59
Proportion out of family setting (percentage)					
		18	9	8	11.3

Comparing these figures with those of the schizophrenics in the same groups, we may observe (a) that a significantly greater proportion of the schizophrenics were out of family setting ($p<0.01$) and (b) that the distributions of cases out of family setting differ in the diagnostic categories, there being a much lower proportion of manic-depressives out of family setting in the central areas (Groups A and B) but a higher proportion in the peripheral, housing estate areas.

Personality and History of Patients Out of Family Setting

From information in the case-notes, the premorbid personalities of all cases living out of family setting were determined. The results were:

	Personality	Schizo- phrenics	Manic- depressives
Abnormal: schizoid		35	5
other		5	13
Normal		13	35
Insufficient information		11	6
Total		64	59

It will of course be appreciated that this classification was based merely on the subjective judgment of the writer. The considerable number of cases in which the personality type could not be satisfactorily determined was in most instances due to the fact that there were no relatives available for interview and the only source of information was a landlady or a fellow lodger whose knowledge of the patient was slight. Subject to these limitations, however, the figures indicate that the proportion of abnormal personalities in the schizophrenic group is very much greater than that in the manic-depressives. The frequency with which the premorbid personality of the schizophrenics was described (by their relatives) in such terms as "very reserved", "solitary", "no friends", "no interests", "never interested in the opposite sex", "always odd" and so on was very striking.

The histories of all the schizophrenics living out of family setting were studied in the endeavour to determine why each was separated from his family and whether this separation was a probable factor in his mental breakdown. Again a subjective judgment was involved but the conclusions reached were as follows:

(1) In 30 of the 64 cases (i.e. 47 per cent.) the principal cause of the patient's separation from his family was his abnormal personality. Such patients tended to be selfish, suspicious and unpredictable. Commonly they had a history of several admissions to mental hospitals. They had often lived with a succession of relatives, quarrelling with each in turn until none of the family wanted anything more to do with them. Quarrels with or paranoid ideas about landladies or fellow lodgers caused them to change their address frequently. Their behaviour tended to worsen over the years and in many cases it was hard to say when they crossed the border between abnormal personality and chronic psychosis. It was impossible to determine whether their isolation from family life had hastened the progress of their disorder but there was no doubt that their personality difficulties had been present long before their isolation.

Case 1

Female, single, born 1915.

There was no family history of mental illness. She was born in Sheffield but when she was 6 her father died and with her mother and sister she moved to Bristol. An average scholar, she left school at 14 and earned her living as a shorthand-typist. She never showed much interest in men, though when she was 27 she had a boy-friend and became engaged to marry him but soon broke off the engagement. When she was 29 her mother died and, her sister being by this time married with a home of her own, the patient went to live with a maternal aunt. This aunt describes the patient as having always been "difficult", quarrelsome, temperamental and reckless with money; but these characteristics now became exaggerated: she became increasingly haughty in her manner, complained acrimoniously about fancied slights and said she had demeaned herself by coming to live with her aunt. For these reasons, the aunt had to ask her to leave after 2 years and the patient then lived alone in a succession of lodging-houses and hostels, still earning her living as a shorthand-typist. Relatives tried to be kind and friendly as they felt she was neglecting herself, but she was, as they said, "impossible".

At the age of 32 she was found to have pulmonary tuberculosis and entered a hospital for rest and artificial pneumothorax, but after ten weeks her behaviour became so disturbed that she had to be certified. She settled well in the mental hospital and without having had any special treatment was discharged "recovered" four months later. Although she returned to the tuberculosis hospital for further care for six months, she then discharged herself against advice, tried to get relatives to give her accommodation and, when she found none of them would have her, took a bed-sitting-room on her own. She remained there for a year, still working as a shorthand-typist, but then began to write letters to the police, the town clerk and other people, complaining that she was being subjected to persecution by electric rays, "atomic lifts" and so on and again it was necessary to place her in a mental hospital under certificate. This time she showed no improvement and has remained in hospital for the past four years, deluded and hallucinated.

(2) There were 21 cases in which separation from the family was forced on the patient by external circumstances (such as the death of the parents or

spouse together with the fact of being childless or an only child). In 18 of these cases (i.e. 28 per cent. of the total number) it appeared probable that the forced separation was a factor of some importance in the development of the illness.

Case 2

Male, single, born 1915.

He was born of Polish parents in America but while still a child returned with his family to Poland and later worked on his father's farm. Taken prisoner by the Germans in 1939, he joined the Polish army after the war, coming to England in 1946. His commanding officer, to whom he was batman, described him as conscientious, honest and hard-working. Since 1947 he earned his living as a labourer but moved lodgings frequently and never stayed long at one job. He was in communication with his family in Poland until 1951, when he ceased to hear from them and ceased to send them parcels. During 1952 he gradually developed delusional ideas that his workmates were against him; he thought he was going to be knifed or poisoned and believed that a pain in the chest was caused by people looking vindictively at him. He went to the police to claim protection and as a result was admitted to hospital as a voluntary patient. One month later he absconded and had to be placed under certificate. Paranoid schizophrenia was diagnosed. He slowly improved in hospital without special treatment and was discharged "recovered" seven months later, returning, at his landlady's suggestion, to his former lodgings, where other Polish friends lived. As far as is known, he has remained well.

(3) In 11 cases (17 per cent.), the patients had of their own choice left their families to live alone and in none of these was the isolation considered to be a significant factor in the development of the illness. Eight of these 11 cases had schizoid personalities but not of the type that rendered them difficult to live with. They had, on the whole, been separated from their families for several years before showing any obvious signs of psychosis.

Case 3

Female, single, born 1928.

A paternal aunt had been in a mental hospital on several occasions but there was no other morbid family history. The patient and her two younger brothers were born and brought up in Bristol. She was a normal healthy child of above average intelligence and after leaving school was employed as a clerk. Her father died when she was 16 but her mother remarried and the patient was said to have been very fond of her stepfather. At the age of 20, however, she decided to leave home, trained as a Church Worker and then worked in this capacity for 2 years, though the quality of her work was lessened by her nervousness and by her exaggerated sense of duty. During the second year she was said gradually to have become secretive and odd in her behaviour. An unexpected proposal of marriage from a clergyman-friend was immediately followed by the onset of an acute schizophrenic illness which necessitated her admission to a mental hospital. After appropriate treatment she was discharged "relieved" eight months later and returned to the care of her family and to her occupation as a clerk. She continued to improve during the next year, lost all trace of her schizophrenic symptoms, married the man who had proposed to her and now, three years after the onset of her illness, is still well.

(4) In the remaining two cases there was insufficient information to determine why the patients had been separated from their families but there was no evidence to suggest that the isolation was a factor of any importance in their illness.

DISCUSSION

The results confirm the main findings of Gerard and Houston; the distribution of schizophrenic cases in family setting did not depart significantly from random, but that of schizophrenic cases out of family setting departed from random to a very significant degree with a great excess in the central districts of the city.

In a previous paper (Hare, 1956) it was shown that, of four major diagnostic groups, only schizophrenia had a distribution throughout Bristol which was significantly non-random. Moreover, the ward rates for schizophrenia showed a close correlation with the proportion of single-person households. The present findings, that the rates of schizophrenic cases in family setting showed no such

correlation while in those of schizophrenics out of family setting the correlation was very close, suggest the conclusion that it is the latter group of cases which largely accounts for the non-random distribution of schizophrenia as a whole. This, together with the finding that schizophrenics out of family setting appear to constitute a special group (they differ significantly from the corresponding manic-depressives in number, distribution and the proportion of abnormal personalities), suggests that a study of the histories and personalities of the patients in this group may provide an explanation of the non-random distribution of schizophrenia. The results of this study may be summarized:

In nearly half the cases (of schizophrenics out of family setting) separation from the family appeared primarily to be due to the patients' difficulties in interpersonal relations; the undoubtedly high residential instability of these patients was attributable to the same cause. Only one-sixth of the patients left their family from their own choice and in none of these did the resulting isolation appear to be a significant factor in their illness (it should be observed that the distinction, whether a patient left his family from choice or whether he proved so awkward at home that his relatives persuaded him to leave or whether there was a combination of these factors, was sometimes difficult to make). In about a quarter of the cases—and these occurred where separation from the family was due mainly to force of circumstances—it seemed probable that the isolation had been an important causal factor in the development of the illness.

The results therefore suggest two causes for the excess of schizophrenic cases in the central wards of Bristol. The principal cause was that personality difficulties (preponderantly of a schizoid nature) resulted in patients leaving their families and moving to where boarding-house accommodation was most easily obtained, that is, in the central districts where the proportion of single-person households is high; the transition from personality disorder to schizophrenia in these patients tended to occur gradually over a period of years. The lesser, though still an important, cause was that individuals who were separated from their families by force of circumstances had to live in boarding-houses (and therefore mostly in the central districts) and that their isolation from family life was a probable (though not, of course, a proven) factor in their illness. The present study therefore provides some evidence in support of both the "attraction" and the "breeder" hypotheses as an explanation of the excess of schizophrenia in the centres of large cities, but it suggests that the former hypothesis accounts for more cases than the latter.

SUMMARY

1. A study has been made of the influence of family setting on the distribution in Bristol of 441 cases of schizophrenia admitted to the Bristol Mental Hospital during a five-year period.

2. The ward rates for schizophrenics living with their families at the time of admission conformed to a random distribution throughout the city and showed no significant correlation with the proportion of single-person households. The rates for schizophrenics living out of family setting were highest in the central districts and showed very significant correlation with the proportion of single-person households.

3. Schizophrenic cases out of family setting were, as a group, significantly different from a group of manic-depressives out of family setting in numbers, distribution and proportion of abnormal personalities.

4. From a study of the histories and personalities of 64 schizophrenics out of family setting, the conclusion was reached that separation from the family was due in one-half of the cases to personality disorders, in a quarter of the cases to unavoidable external factors and in a sixth of the cases to the patients' own choice. In a quarter of the cases, separation from the family appeared to have been a factor of importance in the development of the schizophrenic illness.

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EXPERIMENTAL STUDIES OF A PERCEPTUAL ANOMALY

V. SOME FACTORS INFLUENCING THE APPEARANCE OF THE BLOCK DESIGN ROTATION EFFECT IN NORMAL SUBJECTS*

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INTRODUCTION

THE present paper is a continuation of work previously carried out and is an attempt to define more accurately the conditions under which the rotation effect can be induced in normal subjects.

OUTLINE OF PREVIOUS RESEARCH

The block design rotation effect was first observed in some patients while they were doing the Goldstein Cube Test, in which the subject has to reproduce patterns with the aid of coloured cubes. Some patients, while completing the designs correctly, would leave the completed pattern in a rotated position, apparently without being aware of this (Shapiro, 1951). Such rotation might be as large as 45° (Fig. 1), but rarely exceeded this amount.

Subsequent research has resulted in two main findings:

(i) The rotation effect occurs to a significantly greater degree among brain-damaged psychiatric patients than among non-brain-damaged psychiatric patients—at least within the limits of the samples tested (Shapiro, 1952).

(ii) The rotation effect tends to appear according to definite laws.

The three main laws so far established are:

(a) When the line of symmetry of a design (the line of symmetry being defined as the line which divides the design into mirrored halves) is at an angle to the vertical axis of the total visual field, as in "C" and "D" of Figure 2, the tendency to rotation will be increased. When the line of symmetry is parallel to the vertical axis of the total visual field, as in "A" and "B" of Figure 2, then the tendency to rotation will be decreased.

(b) When the design is in a diamond orientation, as in "C" and "D" of Figure 2, the tendency to rotation will be increased; when the design is in a square orientation, as in "A" and "B" of Figure 2, the tendency to rotation will be decreased. Such orientation is referred to as the figure shape.

(c) When the ground (which is defined as the 6 inch by 6 inch white card on which the design is placed) is in a diamond orientation, as in "B" and "D" of Figure 2, the tendency to rotation will be increased; when the ground is in a square orientation, as in "A" and "C" of Figure 2, the tendency to rotation will be decreased.

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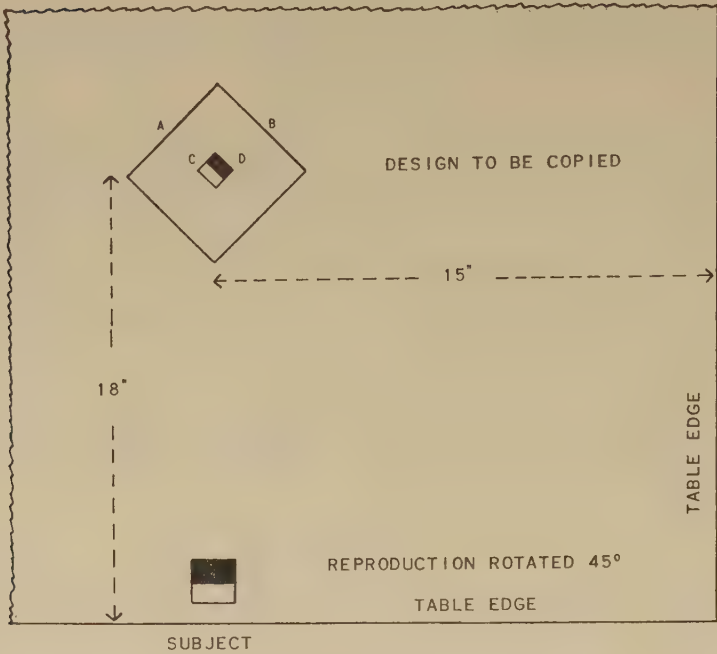


FIG. 1.—Example of a card from the Block Design Rotation Test with the reproduction rotated 45° .

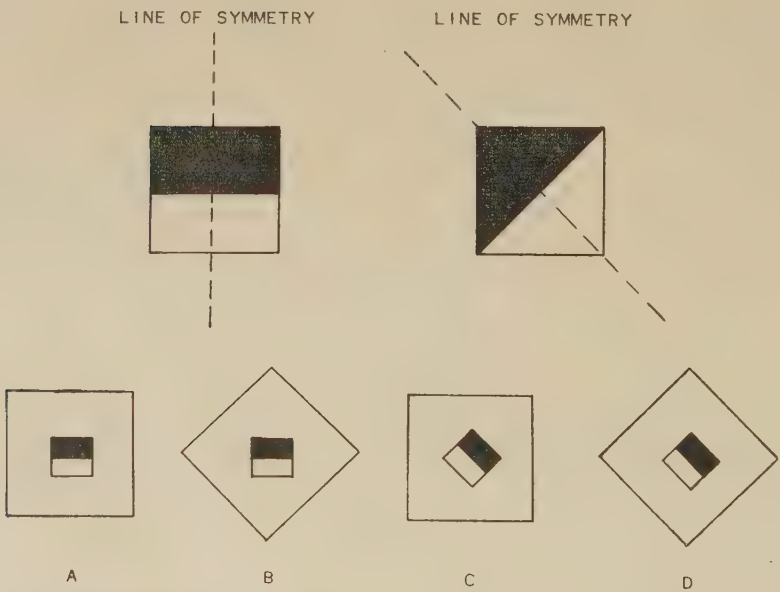


FIG. 2.—Combinations of figure shape, ground shape and angle of the line of symmetry.
 Square oriented figure in cards a and b.
 Diamond oriented figure in cards c and d.
 Square oriented ground in cards a and c.
 Diamond oriented ground in cards b and d.

These laws have been validated only for a special form of the Block Design Rotation Test, which has been described by Shapiro (1952).

From certain considerations (Shapiro, 1953) it was deduced that brain-damaged patients rotated more than non-brain-damaged patients because the former were deprived of many of the visual cues which would counteract the rotation-inducing properties in the cards (described above). In order to test this theory, it was further deduced that normal subjects deprived of most of their visual cues would also rotate to the same extent as the brain-damaged patients and in accordance with the same laws.

Two experiments were carried out to test this deduction. In the first experiment, 20 subjects were tested under two conditions. In the first set of conditions, the subject wore a "field-reducer" consisting of two halves of a table-tennis ball set in felt so that each eye was covered. In one of the halves, a small hole, 6.5 mm. in diameter, was pierced so that the subject obtained only restricted vision. To complete the withdrawal of directional cues, the table surface was covered with plain black paper. In this situation it was predicted that the normal subject would rotate the blocks. In the second set of conditions, the subject did not have to wear the special mask; but for administrative convenience the black paper was left on the table. In this set of conditions it was thought that the directional cues provided by the whole room would be sufficient to prevent the rotation effect from appearing. The outcome was not in accordance with expectation. In both situations the subjects rotated as much as brain-damaged subjects and according to the same laws.

As reported in the previous paper (Shapiro, 1953), it was then decided to carry out a second experiment on normal subjects, this time reproducing as exactly as possible the two original conditions for brain-damaged and non-brain-damaged subjects. Two samples of 20 subjects each were drawn. One was tested under completely normal conditions, the other worked throughout the testing session under cue-reduced conditions, with masks on and black felt on the table. The latter was called the "pseudo-brain-damaged" group. This time, clear results, in accordance with expectations were obtained. The pseudo-brain-damaged group rotated significantly more than the control and as much as the genuinely brain-damaged subjects. They also did so in accordance with the same laws. These results did not, however, explain why it was, in the first experiment, subjects produced the rotation effect with only black paper on the table and without wearing the field-reducer. It was desirable to set up explanations of this finding and to test them experimentally.

DESIGN OF THE EXPERIMENT

(i) FACTORS INVOLVED AND HYPOTHESES TO BE TESTED

Four possible explanations, arising from the conditions of the two previous experiments were considered. None of them, of course, were mutually exclusive.

(a) *Felt v. No Felt*

It was possible that the black surface on the table alone was sufficient to produce the rotation effect and that the artificial cue-reduction obtained by means of the field-reducer was unnecessary. It will be remembered that, in both the experiments discussed above the pseudo-brain-damaged group had worked on felt while doing the test, whereas the normal control group had worked on black paper when it rotated and on the grained surface of the table when it did not.

This graining, however, was so distributed as to produce a definite pattern, possibly providing visual cues which would help to counteract the rotation effect—since the pattern arranged itself in a horizontal manner. It was possible, therefore, that it was the presence of these cues immediately surrounding the test object which prevented rotation in the normal group, and the absence of these cues for the group working on black paper which facilitated rotation. If this were so, then it would follow that the perceptual cues farther out in space, such as the vertical walls, table edges, etc. (the influence of which Shapiro was trying to exclude by means of the field-reducer), would play very little role in the production of the phenomenon.

The first hypothesis was, therefore, that the use of felt would by itself (in the absence of cue-reduction by other means, e.g. the field-reducer) induce rotation to a significant degree.

(b) *Small Room v. Large Room*

In previous experiments, the size of the room used had varied, although within any one experiment, the size of the room had been kept constant. Now, Asch and Witkin (1948) had shown clearly that errors in the perception of the vertical varied systematically as the amount of information to be derived from the surrounding room was varied. In one of their experiments, for instance, judgments of the uprightness of a rod were obtained under three different conditions of the visual field: (i) the subject, standing at a distance from the tilted field, viewed it through a tube which restricted his view to the interior of the scene; (ii) the subject stood directly in front of the scene without a tube; (iii) the subject stood at a distance from the scene, without the tube, so that he saw not only the tilted scene, but the outer upright room as well. Under all three conditions, the perceived vertical and horizontal were displaced significantly in the direction of the visual scene. However, when an outer upright visual field was present, the effect of the tilted scene upon the perceived upright diminished. In fact, the mean deviation from the upright dropped from about 15° with the tunnel to about 7° without the tunnel and with the cues from the room available. While Asch and Witkin did not actually vary the size of the room they used, it seemed a logical inference from their work that the closer to the subject the various indications of the horizontal and vertical were, the more use he would be able to make of them in counteracting the rotation-inducing tendencies of the cards. Such indications would be closer in a small room than in a large one. It was therefore predicted that if the size of the room were increased, a significant increase in rotation would result.

(c) *Distance of the Card from the Edge of the Table*

In his experiments, Shapiro had at different times placed the cards so that their centre was 12 inches or 18 inches from the edge of the table and the possible effect of this factor had not been investigated. With the card at a distance of only 12 inches, the subject might obtain at least some peripheral vision of the cards while constructing the pattern with the blocks. This would then become an important variable, since it was stated explicitly (Shapiro, 1953) that the card and the area where the patterns were constructed could not be viewed simultaneously.

It was therefore predicted that significantly more rotation would be produced when the cards were at a distance of 18 inches than when they were at a distance of 12 inches.

(d) *Experience v. Lack of Experience*

In all the previous experiments, except one, the subjects had been given the Wechsler Block Design test, in order to familiarize them with the material before the administration of the Rotation Test—the one instance in which this procedure was not followed produced the ambiguous results already discussed above. There was therefore the possibility that lack of experience might lead to increased rotation, since unfamiliarity with the situation might result in over-dependence on the most striking visual cues, i.e. the patterns.

The prediction was therefore made that subjects who had not been given the Wechsler Block Design test the day prior to the Block Design Rotation Test would produce significantly more rotation than those subjects who were experienced.

One further factor, not directly arising out of the earlier experiments was also included in the experimental design.

(e) *Intelligent v. Dull Subjects*

In his experiments, Shapiro had obtained a measure of control over intelligence by omitting those subjects who obtained a Wechsler Vocabulary weighted score of 6 and below. It happened that in most of the earlier experiments, the subjects were reasonably well matched for intelligence (e.g. Yates, 1954). In two pilot experiments, however, involving subjects of average and superior intelligence the results obtained were equivocal and it was considered that there was a need to control this variable also as it might prove to be a source of significant variation.

The prediction was made that persons of high intelligence would rotate significantly less than persons of low intelligence.

To summarize, it was predicted that rotation would be significantly increased by:

- (a) Felt on the table;
- (b) Increasing the size of the room;
- (c) Increasing the distance of the stimulus-card from the edge of the table;
- (d) Lack of experience with the blocks;
- (e) Low intelligence on the part of the subject.

(ii) DESIGN OF THE EXPERIMENT

The 2ⁿ factorial design for experiments was used, each factor being varied in only two ways. In the resulting analysis of variance, there were thus five main actions—Felt (F), Room (R), Distance (D), Experience (E) and Intelligence (I)—ten first-order interactions, ten second-order interactions, five third-order interactions and one fourth-order interaction, with a total of 31 degrees of freedom.

The following is a brief description of the various conditions under which the experiment was carried out. These conditions are, of course, derived from the hypotheses discussed above.

(a) *Felt*

For half the subjects, the table was completely covered in black felt, which offered no spatial indications at all to the naked eye. The other half worked on the grained surface which has already been fully described (Shapiro, 1953).

(b) *Room*

Two sizes of room were used:

(i) *Small Room*. This room was about 12 feet by 6 feet, and was relatively full of objects, e.g. a large chest of drawers, three chairs, etc., so that there were no empty spaces against the walls.

(ii) *Large Room*. This room was more than twice the size of the small room, being approximately 20 feet by 20 feet in size. Besides the table and chairs used for the experiment, the only other objects in the room were a built-in cupboard and a wash-basin.

(c) *Distance*

The subjects were equally divided between the two distances, which have already been fully described.

(d) *Experience*

Half the subjects were tested in two separate sessions. In the first session, these subjects were given the three Wechsler sub-tests used to estimate intelligence-level (Vocabulary, Similarities and Block Design—the latter test also serving as a practice or familiarizing test with the blocks) and in the second session the rotation test under the appropriate conditions. These are called the Experienced subjects. The remaining half of the subjects were given all the tests on the same day and at the same session, the Rotation Test being administered after the Similarities and Vocabulary tests, but before the Block Design test. These are called the Inexperienced subjects. The order of testing for the two groups was therefore as follows:

<i>Experienced Subjects</i>	<i>Inexperienced Subjects</i>	
1. Vocabulary	1. Vocabulary	} same day
2. Similarities	2. Similarities	
3. Block Design	3. Rotation Test	
One-day Interval		
4. Rotation Test	4. Block Design	

(e) *Intelligence*

The subjects used in this experiment were placed in one of two groups according to whether they were of "high" or "low" intelligence. These terms are, of course, relative ones in this context, since the group as a whole was probably significantly above average in intelligence compared with the general population (the mean I.Q. for the whole group was 113.50). It did not prove possible to test the group as a whole for intelligence prior to the main experiment. In order, therefore, to split them into high and low intelligence groups with the least amount of wastage, the following procedure was adopted. It was known that the subjects came from an environment closely similar to that of subjects previously used as controls, i.e. the subjects were all nurses in study block at the time of testing and came from similar social and cultural backgrounds; nor did they differ in age, education, etc., from previously tested groups. The intelligence scores of these previously tested subjects were therefore used, the median point being calculated for the sum of the raw scores on the Vocabulary and Similarities sub-tests (this was 39.5 raw score points). For the present group, therefore, any subject obtaining a score above this point was arbitrarily

called "intelligent", while any subject scoring below it was called "dull". That this procedure was successful is shown by the fact that the wastage of subjects was small (i.e. it did not prove difficult to obtain equal numbers of subjects above and below the cut-off point) and the fact that the method succeeded in obtaining two groups equal in numbers and significantly differentiated from each other in terms of intelligence. The Wechsler Block Design Test was not used in the determination of intelligence since, in the case of the Inexperienced subjects, this sub-test could not be given until the subject had taken the Rotation Test and had therefore already been allocated to a cell.

(iii) ALLOCATION OF SUBJECTS TO THE CELLS

As far as possible, subjects were allocated to cells randomly. Although this was not possible entirely (due to difficulties associated with the number of different possible conditions) it is not considered likely that any systematic bias was present.

(iv) SUBJECTS

For the experiment 32 female subjects were used. A number of other subjects had to be rejected because they could not be fitted into appropriate categories.

RESULTS

In an analysis of variance experiment without replication, the usual procedure is to pool the higher-order interactions along with their associated degrees of freedom in order to obtain an estimate of the degree of experimental error. The mean square arrived at in this way is used in the manner in which the mean square based upon the variation within groups is used in experiments with replication, that is, as an estimate of the uncontrolled variation against which to test the significance of the other mean squares. This procedure is, of course, based on the assumption (which, without replication and a proper test of significance cannot be proved) that the variance obtained by pooling the higher-order interactions with the error variance would not differ significantly from the variance obtained with replication—in other words that the higher-order interactions are not significant. There is no reason to think that these assumptions are being violated in the present experiment, since the subjects used were very similar to those of previous control groups, about whom a great deal was known. the various groups having proved very similar with respect to intelligence, education, socio-economic status, etc.

In the analysis of variance, the first step was to pool the third-order interactions with the fourth-order interactions. This resulted in a mean square of 36.33, with 3 degrees of freedom. When the second and first-order interactions were tested for significance, using this mean square as an estimate of error, none of the interactions reached the 5 per cent. level of significance. Having established this, it was now legitimate to combine all the interaction sums of squares with their respective degrees of freedom and use the resulting mean square to test the significance of the main actions. The results obtained are shown in Table I. It will be seen that the mean square now being used as an estimate of the error variance is 27.42 with 26 degrees of freedom. In this way, a more sensitive test of the significance of the main actions is obtainable, using 1 and 26 degrees of freedom. However, the only main action which shows a significant F ratio is Felt v. No Felt, with an F ratio equal to 12.83 (significant

beyond the .1 per cent. level of confidence). None of the other main actions reached the 5 per cent. level of significance. Table II shows the means and standard deviations for each of the main variables considered in this experiment.

TABLE I

Results of Analysis of Variance After Pooling of Higher-order Interactions

Variable					df	Mean Square	F ratio	P
Room	..	..	..	..	1	67.46	2.460	NS
Felt	..	..	..	..	1	351.92	12.834	.005
Distance	..	..	..	..	1	0.19	—	NS
Experience	..	..	..	..	1	73.08	2.665	NS
Intelligence	..	..	..	..	1	18.12	—	NS
Error	..	..	..	..	26	27.42		
Total	..	..	..	..	31			

TABLE II

Means and Standard Deviations for Main Variables

Variable					Mean	S.D.
Felt	..	..	..	..	9.98	7.41
No Felt	..	..	..	..	3.35	1.79
Large Room	..	..	..	..	8.11	7.26
Small Room	..	..	..	..	5.21	4.93
12 inches	..	..	..	..	6.74	7.24
18 inches	..	..	..	..	6.59	5.36
Experienced	..	..	..	..	8.17	5.50
Inexperienced	..	..	..	..	5.15	6.51
Intelligent	..	..	..	..	5.91	4.96
Dull	..	..	..	..	7.41	7.47

The principal results obtained with respect to the hypotheses put forward in this experiment may be summarized as follows:

(a) *Felt v. No Felt*

The hypothesis is strongly supported. Reduction of visual cues by means of felt is sufficient to induce the rotation effect to a highly significant degree. It is not necessary to introduce artificial reduction of the visual field by means of a field-reducer to obtain the rotation effect. Consideration of the results obtained here and of those obtained in the experiments carried out by Shapiro suggest the conclusion that the decisive factor in inducing rotation in normal subjects must be the presence or absence of visual directional cues *immediately surrounding the stimulus figure*. The cue which most subjects utilize under the usual test conditions would seem to lie in the graining of the table, which, as already pointed out, seems to offer clear horizontal indications. For fully satisfactory proof of this conclusion, however, it must be pointed out that two further experiments would be necessary. In the first place it would be necessary to demonstrate that normal subjects would rotate if the table top were of *any* uniform kind, i.e. that the graining really is being used as a visual cue and that no quality of the felt other than its uniformity is important in inducing rotation.

In the second place, it would be necessary to show that subjects wearing the field-reducer would not rotate when working on the graining provided, of course, that they were able to perceive the graining while wearing the field-reducer.

(b) *Large v. Small Room*

The size of the room made no significant difference to the rotation effect in the present experiment, although the difference in the means was in the predicted direction. It may be noted that everything was in favour of the appearance of a significant difference. For example, the small room had at one time been a bathroom and the walls were tiled half-way up to the ceiling, so that clear visual vertical and horizontal cues (and their precise relationship to each other) were directly opposite to the subject at a distance of only about $2\frac{1}{2}$ feet directly in front of him. In the large room, on the other hand, the walls were entirely distempered and hence relatively unstructured with respect to visual cues. It may be pointed out, however, that the analysis of variance shows a tendency close to significance on the part of the room variable to interact with the felt variable in the predicted direction; this interaction had the highest mean square of all the interactions. It is possible that the use of an even larger room would have produced a significant interaction and possibly even a significant main action for Room.

(c) *Distance*

That this variable did not prove significant is not surprising in view of the failure of the room size to affect the rotation phenomenon.

(d) *Experience v. Inexperience*

The hypothesis concerning the influence of experience on the rotation effect was not confirmed and the mean values were actually in the opposite direction. It seems safe to conclude that for samples of subjects similar in nature to this one, experience or non-experience of the Goldstein blocks prior to being given the Rotation Test will not influence performance on the latter.

(e) *Intelligent v. Dull Subjects*

The 32 subjects were successfully separated out into "intelligent" and "dull" by the method previously described. The mean combined raw score for the "intelligent" group was 43.75; while that for the "dull" group was 33.53. Analysis of variance between the two groups yielded an F ratio of 56.91 (1 and 30 degrees of freedom). Since the numerator of F has only 1 degree of freedom, this is equivalent to a t of 7.55, which is significant at the 1 per cent. level of confidence. The prediction that these groups would differ significantly in the amount they would rotate was not, however, confirmed.*

DISCUSSION

In the first place, it seems that the results obtained in the first experiment by Shapiro discussed in the introduction can be arrived at without recourse to the field-reducer. All that is necessary is a homogeneous black surface on

* It may be added that analysis of variance carried out separately on the rotation scores of the two groups (16 on Felt; 16 on Graining) showed that the factors influencing the rotation effect (Figure shape, Ground shape, Angle of the Line of Symmetry, etc.) exercised the same relative influence as in previous studies on similar groups by Shapiro (1952, 1953).

the table. Thus, it would seem that the negative induction effects presumed to be operating in brain-damaged subjects do not need to be quite as drastic as was first envisaged in order to produce the rotation effect. Furthermore, it would seem that, in so far as our visual perception of objects is influenced by the surrounding visual field, the decisive factors which help to determine the nature of such perceptions may sometimes at least be restricted to those which immediately surround the object of perception. Thus, visual perceptions may be radically changed, not by controlling the complete range of visual perceptions available to the subject, but simply by concentrating the subject's attention by means of a suitable task and varying only a limited aspect of his environment. Hence, in the present experiment, it was necessary only to remove the horizontal indications immediately surrounding the test object for the subject to be significantly influenced by the special properties of the test object. It did not prove necessary to remove visual vertical and horizontal indications even a few feet away from the subject. In this connection, it is interesting to recall the experiment of Holway and Boring (1941), who used similar but rather elaborate methods of cue reduction to eliminate the constancy phenomenon. They showed that, the more thoroughly visual cues were removed, the closer objects approached their retinal size. However, they went from full or monocular vision to field-reducer or even more restricted ("tunnel") vision, without exploring simpler methods of cue-reduction. It is possible that their effects could have been produced by the method used here.

The results of the present experiment may also be compared with those obtained by Witkin and Asch (1948). After experimenting with elaborate visual set-ups, specially constructed rooms, etc., they found that equally if not more striking results could be obtained simply by placing the subject in a dark-room. As one example of their work, we may quote the experiment in which they showed their subjects a diamond-oriented square and asked them which side was the top. Most subjects, of course, correctly chose the top-right or left-hand side of the diamond; a few subjects, however, made gross errors and said that the bottom sides were the top. Apparently, when deprived of their normal visual cues, they were unable to distinguish top from bottom in the usual way—nor did they seem able to make use of other cues not normally dominant, such as kinaesthetic cues.

The present results may also have some implications for the treatment of brain-damaged patients. If, in fact, the pseudo-brain-damaged subjects in this experiment were behaving like brain-damaged patients, then it would seem to follow that some brain-damaged patients are unable to utilize cues in their immediate environment, i.e. they are grossly stimulus-bound. The problems involved in teaching such patients would clearly be very great. The present experiment, however, seems to provide a starting-point for such therapeutic experiments, such as the removal of the rotation effect in normal and abnormal subjects. It might be possible in some cases to remove the rotation effect where it exists by simple repetition (i.e. practice, the brain-damaged patient who rotates differing from the normal person who does not merely in taking longer to make use of rotation-counteracting cues). On the other hand, other subjects may require their error simply to be pointed out to them for them to stop rotating. In yet other cases, specific visual aids might be necessary before the rotation effect could be dispersed. The present results are also useful in so far as they enable a definition to be given of the simplest conditions under which the rotation effect may be induced in normal subjects.

Finally, it must be stressed that the results obtained in the present experi-

ment should not be generalized beyond the group on which they have been established. It may well be that such factors as intelligence, experience with the blocks, size of the room and distance of the stimulus-card would prove to be of importance in determining the amount of rotation produced by brain-damaged or other patients; as well as the interaction of these variables.

SUMMARY

Previous experiments on the block design rotation effect had left several problems unsolved. The present experiment was designed to investigate the influence of a number of factors on the induction of the rotation effect in normal subjects. Five factors were systematically varied—Felt, Size of Room, Distance of stimulus-card, Experience with blocks, and Intelligence level. The major factor influencing rotation in normal subjects is shown to be the presence or absence of felt on the table, no other factor playing a significant role. The implications of these findings are discussed.

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CRIME AND FOLIE À DEUX: REVIEW AND CASE HISTORY

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"*Motions* passe from one Man to another, not so much by Exciting Imagination; as by Imitation; Especially if there be an Aptness or Inclination before."

Francis Bacon (1627)

THE phenomenon to which Lasègue and Falret in 1873 applied the term "folie à deux", had many times previously been recognized and described. William Harvey (1651) noted a case, and his contemporary, Sir Kenelm Digby (1658) not only recorded an excellent clinical description but suggested a psychopathology (Greenberg *et al.*, 1956). For Lasègue and Falret, folie à deux was a social rather than a psychiatric phenomenon: the second "passive" subject, they believed, was not truly psychotic but simply "absurdly credulous". As they saw it, the more authoritative and intelligent "active" partner created the delusions and imposed them on the "passive" subject. This was more likely to occur in a setting of prolonged and isolated intimacy. The delusions were more likely to be accepted if they were plausible and played on the hopes and fears of the second subject. Heredity, they pointed out, offered no overall explanation, for this process frequently involved unrelated individuals. The second subject often accepted the first's delusions only after a fruitless and exhausting struggle to restore his sanity: "the indifferent escape both this useless travail and its consequences." They held the prognosis for the "passive" subject to be invariably good, providing that the pair were separated. As early as 1563 Wier, writing on the cure of nuns afflicted en masse by demoniacal possession, had advised this course.

As discussed elsewhere (Greenberg, 1956) current textbooks overlook a vast literature which, among other things, indicates that the prognosis of the second subject is not necessarily good; that frequently his psychosis is as "real" as that of the first—rapid remission does not invalidate a phenomenological diagnosis of psychosis; that all gradations between simple acceptance of delusional ideas and unequivocal psychosis occur; that postulation of a genetic predisposition to schizophrenia explains nothing of the observed psychological phenomena. Thus, Mayer-Gross *et al.* (1954) state that "... paranoid reactions show a particular tendency to spread by psychological contagion . . . one usually finds that one member of a pair or more of affected persons is suffering from an organic or endogenous illness, while the others are ill only in a social sense". They regard the prognosis as "excellent . . . if the isolation can be broken and the primary source removed". Curran and Partridge (1955) hold similar views and believe that on "separation of the parties concerned, the secondary sufferers from the condition readily recover through the corrective effect of mingling with more normal people, although the real sufferer from the disease does not". Henderson and Gillespie (1950) and Laignel-Lavastine (1951) express themselves similarly.

It is intended here to direct attention to some examples of folie à deux of forensic interest, certain aspects of which are inadequately accounted for by current formulations. There are however a number of recorded instances which can be described in Lasègue and Falret's terms. Kiernan (1883) was the first to remark on their forensic importance, though many before Lasègue and Falret had concerned themselves with the question (Esquirol, 1821; Livi, 1868; Despine, 1870; Smith, 1875 and others). Thus Boedeker (1891) published the case of a young man, arrested for stealing useless articles of clothing from restaurants. He was discovered to be acting out the delusional ideas of a "chronic paranoiac" who dominated him; on being separated from him, he rapidly gained insight into the irrational nature of these ideas. The young man had himself no conscious motivation for the thefts, and in this differed from the cases described by Moreau de Tours (1893) in a paper entitled "Le Crime à Deux". Moreau believed this to be an entity more or less identical with folie à deux and occurring under similar conditions; the second subject must be less intelligent, "more disposed to passive docility than to emancipation", living in constant relation with the dominant partner and "involved by the lure of a personal interest . . . As in folie à deux, one finds a more intelligent subject who foments the crime, a less intelligent subject who lets himself be outwitted and carries it out." Accordingly he thought that the legal responsibility of the instigator must be regarded as greater than that of the "blind instrument of the crime".

But the inadequacy of regarding the "passive" partner in a psychotically motivated crime simply as a credulous "malade par reflet" is obvious when behaviour so aberrant as murder is involved. Craig (1905) held that such people could be regarded as psychotic by the very fact that they acted upon as well as believed in their partner's delusions. This certainly applied to the case cited by Moreau, where a youth killed his father at the instance of his paranoid mother, who herself took no part in the assault. Similar crimes have many times been recorded. Hofbauer (1846) described the induction of a delusional psychosis in the several members of her family and her fiancé, by a girl suffering from "nymphomania"; one of her brothers was drowned in response to her delusional commands, the family throwing him down a well. Taguet (1887) reported the murder of a girl by her family at the instance of her psychotic brother. He had induced a psychosis in his three sibs and mother—a fourth sib, away from home, was unaffected—all experienced various hallucinations and came to believe that one of the girls was possessed by a demon. She herself asked to be killed and the family made three openings in her body to let out the demon. All remained chronically insane. Woods (1889) described a similar episode in an Irish peasant family. Induced by the eldest daughter, the mother and three sibs murdered a fourth in the belief that he was "a fairy changeling". All except the eldest daughter rapidly recovered. Archambault (1907) recorded the case of a woman who, more intelligent than her husband, had long dominated him; she introduced him to the practice of spiritualism, in which she had long been interested. Coming to believe herself "possessed", she induced a similar state in her husband. Under the guidance of his possessing spirit, he thereupon murdered her. He too remained chronically psychotic. Knigge (1939) described an almost identical case. Levassort (1912) noted a similar case to Moreau's: a psychotic woman instigated her son to murder her husband. This the boy did, after two months of discussion with his sibs as to the best way to accomplish it. More recently Tolsma (1951) has discussed a murder resulting from induction of psychosis in a family group: a young man, experiencing various hallucinatory manifestations, believed these to be of divine

origin and actively induced the "conversion" of his eight sibs and parents; they then announced the formation of a new religion. Only one brother had remained sceptical for any time but, finally "converted", expressed great guilt and unworthiness. He was promptly denounced as "the evil one" and jointly murdered by his family in a particularly barbarous fashion. The inducer remained psychotic, the psychoses of the rest of the family remitting within a few months.

Cucchi (1947) investigated the murder of a peasant by a neighbouring family, consisting of mother, son and daughter. It turned out that this had been instigated by the mother—the wife of a chronically psychotic man, whose suicide was the immediate precipitant of the murder. His delusions of persecution by witchcraft had originally been fixed when assured by a local expert that his hypochondriasis resulted from this source. Over some years he had conveyed his beliefs to his family, with the consequences noted above. Similar familial psychoses, stopping short of murder often only through extraneous circumstances, have been described. Dagron (1861) graphically described the violence with which two psychotic sisters resisted his attempts to remove them to hospital; they turned their home into a kind of fortress to which Dagron, aided by the gendarmerie, had to lay siege. Funaioli (1887) published the case of a young woman, who began to attribute her gastric pains to poison and witchcraft. Her three brothers and mother became "maniacal" and threatened the lives of the supposed persecutors. In Schlöss's (1891) case, the brother of three acutely psychotic sisters repelled approach to their house with a shot-gun, sharing the family delusion that all strangers were agents of the Devil. Sommer (1904) reported the case of a middle-aged man with systematized persecutory delusions for many years, who himself did nothing about them, whereas his wife finally attacked one of the "persecutors".

The tendency of such psychotic states to spread beyond the original, usually familial, group is well-documented. Here we would mention only a few relevant examples. Folsom (1880) recounted the history of a member of a revivalist sect in a New England village. This man developed messianic delusions in which his wife and mother-in-law came to join. Eventually, now identified with Abraham, he ceremonially killed his young son, all the time expecting heavenly intervention to prevent it; his son murdered, he confidently predicted his resurrection on the third day. In all this he was supported by some eighteen neighbours who had accepted his ideas prior to the murder. These individuals subsequently gained insight into what had happened, but the man and his wife remained chronically insane. Sikorski (1898) retailed an appalling story of mass suicide in provincial Russia. A sect of "Old Believers" was induced by a psychotic girl to believe that the end of the world was at hand. But first, she revealed, they were to be cruelly persecuted. Rather than suffer this, under her direction they contrived to bury themselves alive, nineteen at first and six, four days later; the girl herself was in this last group. The survivors were arrested at this stage, but refusing to eat in custody, were allowed to return to their homes under strict supervision. Sikorski could only attribute all this to "a Slavic tendency to pessimism and strong passivity"! Romano (1921) in an extensive survey of induced psychosis, mentioned the case of a menopausal woman who became persuaded that she had conceived of the Holy Ghost; her two daughters and later the entire neighbourhood joined her in this belief. Directed by the delusionary exhortations of the inducer, three of these women attempted the manual extirpation of the uterus of another, "because it was the seat of all evil".

The intimate relationship between murder and suicide indicated in many of these examples is highlighted in a note by Delasiauve (1869): a mother and daughter, attributing their hallucinatory experiences to police persecution, attempted to poison themselves; this proving ineffectual, the mother strangled her daughter but then felt unable to kill herself and surrendered to the police. Delasiauve remarked that "such agreements are not exceptional" and it is likely that many suicide pacts are of this nature. Kovalevsky (1896) recorded the suicide of five sisters, following their mother's death. Dominated by the eldest, they had long been patently psychotic; they prepared their suicide in a singularly detached fashion, had their pet animals destroyed and put their financial affairs in order, before quietly gassing themselves. A comparable case, though on a larger scale, was reported by Minovici (1929): a paranoid schizophrenic girl induced ten members of her family to gas themselves following an elaborate ritual Last Supper. Ballotta (1940) recorded the collective suicide of a whole family. Believing himself ruined by his persecutors, the father induced his family to commit suicide with him, "which they did in a singularly cold-blooded fashion: husband, wife and three children lay down on the railway track and waited for the train to pass over them". Pitres and Régis (1902) had remarked that certain "suicides à deux ou à plusieurs" were analogous to folie à deux—a thesis earlier sustained by Chpolianski (1885). Pitres and Régis also referred to crimes committed under the influence of "compulsions by contagion or suggestion".

The problem had been adumbrated by Magnan (1893) when discussing the supposed distinction between the *délirant chronique* (paranoid schizophrenic) and the *persécuté-persécutateur* (paranoiac): "The *délirant chronique* sometimes causes those who live with him to share his delusion; the *persécuté-persécutateur* is still more easily able to communicate his delusional beliefs. He has made himself a fighter for justice, he has suffered and struggled against the courts, doctors, authorities and all his battles, all his setbacks have but increased his desire for revenge. His attitude of one oppressed but not downcast brings sympathy, his misfortunes move many, while his intellectual activity, the dialectic with which he sustains his claims, the absence of all sensorial disturbance compels the belief of certain people. While for the *délirant chronique*, contagion is limited to those closest to him, for the *persécuté-persécutateur* it spreads beyond, and the patient finds his defenders in the press and public. It can be understood what difficulties of all kinds the specialist finds himself up against in examining these patients. It is these obstacles which explain why the useful measure of hospitalization intervenes only when, as Krafft-Ebing says, 'the patients have wasted all their possessions, wearied the courts with their interminable prosecutions, disturbed public order, destroyed respect for the law, caused their intimates to share their delusion and even avenged themselves by murdering their enemies'."

Instances of these less violent concerted delusional activities are legion and patently touch on the question of the psychology of large groups. But a few clinical examples may be referred to here. Roller (1894) described the activities of two spinster sisters, the younger of whom, after being troubled for years by "peculiar uterine sensations" developed an explanatory delusional system of a persecutory kind. In this she was joined by her sister and a brother. They published denunciatory pamphlets against their persecutors and thus came under medical observation. They had lived together for so many years that Roller could not bring himself to separate them in hospital, where of course they maintained their joint delusional system.

An Italian forensic *cause célèbre* was the acquittal, in 1892, of five young peasants, following psychiatric testimony as to their collective insanity. (A higher court held that they were nevertheless responsible and awarded short prison sentences.) They had broken into a house and threatened violence in an attempt to gain possession of a book, *Il Libro del Comando*, reputed to have magical powers. This mysterious volume was said to have belonged to a local Faustian figure, one Don Ortensio Giacobazzi, who had many years before been the local parish priest; he was believed to have sold his soul to the Devil in return for the ability to perform various miracles with the aid of this book. The peculiar relationship of these men—they were from several different families—and their strange motivation led to psychiatric examination. Cionini (1892) produced the resounding diagnosis of *Paranoia primitiva, degenerativa, sistematizzata, allucinatoria, demonologica a cinque*. The case was also discussed by Tamburini (1892) and Semelaigne (1893), and more recently reviewed by Boldrini (1938).

Kalmus (1902) reported the unique case of a chronically paranoid woman who, after twelve years, induced a similar psychosis in her husband; the latter became acutely excited and, being removed to hospital, recovered in six months. Through her husband's illness the wife came under observation, and while her husband was in hospital, was herself removed to hospital under certificate. On discharge from hospital, the husband sued for divorce. Evidence being given that, were he to resume living with his wife, there was every likelihood of his again becoming psychotic, he was granted a divorce under the then German divorce law.

Medlicott (1955) has published a remarkable case study of two adolescent girls who jointly murdered the mother of one of them. He regarded their mental state as "paranoia of the exalted type" and the shared psychosis as a *folie simultanée*. However, using the criteria put forward by Macalpine and Hunter (1955), of hypochondriasis—"body delusions"—and confusion over sexual identity, as basic disturbances in paranoid schizophrenia, these girls can be so classified. As has been suggested (Greenberg, 1954) these phenomena provide a basis for a better understanding of induced psychosis. In this case hypochondriasis was marked (Medlicott, personal communication) and the girls' homosexual relationship involved a constant confusion of sexual roles, in addition to tentative exploration of heterosexual relationships. Their basic delusional system seemed founded on a series of somatic hallucinatory experiences, culminating in the fixed belief that they each had "an extra part to their brain", which could apprehend a paradisaal "Fourth World". Their grandiosity was closely related to the fixing of these delusions by their hallucinatory experiences. The history also suggests that the younger girl, whose mother was the victim, though less intelligent, dominated the elder girl and originated the plan to murder her own mother. It thus seems probable that this was an instance of *folie communiquée* (Marandon de Montyel, 1881) rather than *folie simultanée*; the latter diagnosis almost invariably derives from the difficulty in obtaining a clear retrospective history, once the joint psychotic system has been elaborated—as strikingly demonstrated in Régis's (1880) original case-histories.

CASE HISTORY

We wish to record here a case of matricide, in which the son was assisted by his father. Although much detail of their psychiatric histories is unavailable, some points of psychopathological interest emerge. The objective facts are that the son impulsively killed his mother by blows over the head with a poker, immediately after which the father decapitated the body with a kitchen knife, apparently at the son's direction.

The son, aged 27, had a long history of psychotic disturbance; he is said to have had ideas of reference at the age of 12, and after an examination at the age of 18, cut his throat because voices urged him to kill his mother. Of high intelligence, he was considered by his fellow university students to be odd, extremely obstinate and opinionated; on occasion, he was noticeably grandiose. For about a week before the murder he complained of various somatic symptoms. Later he said that he was compelled to kill his mother "to get inner peace through a right relationship with God". While awaiting the arrival of the police after the murder, he pointed out to a neighbour a religious pamphlet in which he had previously underlined a passage recounting David's decapitation of Goliath. To the police he stated: "I got a poker and this evil spirit caused me to wallop her with the poker, as I thought she was an evil force. My father was still frightened of her, so I had to get him under my power and send him for the knife and get her head cut off. We just managed her. I have always been scared since I was a lad that I might go like I nearly went tonight, that is, mad. My father had a breakdown when I was young, and I realized that she was a Power. It was not (due to his work), it was Mum."

For several weeks after the murder he remained in a state of excitement and elation; later he said that this was "the only alternative to terrible and gloomy thoughts". For several years now he has remained in a state of mild exaltation with a sense of divine vocation.

The father, aged 56 at the time of the crime, was a man of superior intelligence, who, despite early promise, had not succeeded in his profession. This was largely the result of several prolonged hypochondriacal illnesses, which kept him at home for long periods, eventually leading to his premature retirement. His wife, according to acquaintances of the family, was a difficult, aggressive and bad-tempered woman, who effectively dominated both her husband and son. Prior to the murder, the father was described as a subdued, retiring man, who suffered from intermittent bouts of hypochondriasis with mild depression; he was not known at any time to have expressed any delusional ideas or aggressive intentions.

His version of the murder was that: "I met my son at the bus, he was crying and we came into the house. There was a quarrel about religion between him, his mother and myself. Suddenly he picked up the poker and hit her across the head while she was sitting in the chair; after one or two strokes I ran for the knife and cut her throat to save her any pain. After that we ran about on the road in front of the house, then when I saw him threatening other people with the poker . . . I was glad I caught him in case he did anyone else any harm . . . if there is any punishment in the law, I want to bear it all and not my son."

As it was established that the woman was already dead when decapitated, the husband was not charged, but sent to hospital. The son was found unfit to plead to a charge of murder. Soon after the murder, the older man passed into a stuporose condition, punctuated by impulsive aggressive outbursts. In this state he remained for several years until with increasing dementia (arteriosclerotic) he became more communicative. He would never, however, refer to his family or his wife's death.

DISCUSSION

What sense can be made of these events? Nine years previously the son had cut his own throat rather than obey impulses to kill his mother. But on the fatal occasion, the focus of longstanding hostility in both her husband and son, the mother appears to have precipitated a quarrel which roused the latent aggression of her son to a degree that overwhelmed any capacity to restrain it. On the evidence of the underlined pamphlet, it seems probable that for some time he had sustained a phantasy of himself as a divinely guided champion against evil—David against the mighty Goliath—and in this guise, destroyed his mother. Parallel with this delusional concept, his recognition of longstanding hatred of his mother, *qua* mother, can be discerned: "My father had a breakdown when I was young and I realized that she was the Power. It was not (due to his work), it was Mum."

What of the father's part? It seems likely that his son's attack mobilized his longstanding hostility to his wife, sufficiently for him to act out, at his son's direction, the phantasy of decapitating Goliath—although there is no evidence of his knowing his son's motivation in ordering the decapitation. Nor did he know that his wife was already dead, for he stated that he "cut her throat to save her pain"—patently a desperate retrospective rationalization. While his subsequent stupor might be regarded as reactive depression, the impulsive attacks on fellow-patients indicate that control of his aggression after the murder was never again complete. But his sense of guilt was clear in his appeal: ". . . if there is any punishment in law, I want to bear it all and not my son."

Now in the whole tragedy, the most singular event is the loss of control, in a matter of minutes, of murderous impulses which the husband had effectively kept from consciousness over a very long period. In that his son's emotional state and behaviour presumably corresponded to his own, hitherto unconscious phantasy, he temporarily became his son's instrument for its realization. It will be recalled that he later prevented his son from attacking other people; so, in effect, they acted jointly, only when the basic phantasy—killing the wife and mother—coincided.

This process might be described in many different conceptual frameworks: that the father experienced a temporary "dissociation"; that repressing forces suddenly failed; that he "identified" with his son; that non-specific excitement at his son's behaviour led to confusion and automatic obedience to his son's orders, and so on. But one basic phenomenon seems apparent: affect of a specific kind in the son aroused similar affect in the father, or at least evoked it in far greater degree than would otherwise have obtained. Thus what Claude (1926) called the *phénomène de résonance*—the "sympathy" or "empathy" of the older authors—appears to have provided the affective activation of the father's quiescent unconscious phantasy. This is not the place to speculate on the nature of "sympathy" or "empathy", but one may point out that the question is not elucidated by tautological invocations of "suggestion" and "identification".

SUMMARY

The literature of folie à deux in relation to crime is briefly reviewed, with special reference to crimes of violence. A case of matricide with the father's participation is reported. It is pointed out that the phenomena involved are not at all well-understood in terms of current theory.

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DETERIORATED PSYCHOTIC PATIENTS— THEIR TREATMENT AND ITS ASSESSMENT

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INTRODUCTION

THE problem of long-stay patients in mental hospitals is assuming increasing importance. At present, in most large mental hospitals the long-stay patients occupy 80 to 90 per cent. of the beds. The investigation by Freyhan (1955) suggested that although the new methods of treatment of the last 30 years have greatly increased the speed of recovery in the case with the good prognosis, they have not altered the outlook for the deteriorating case. This is in general confirmed by May (1956). Now these patients may have a yet longer stay because of the increased life span.

SURVEY AND LITERATURE

The present methods of treatment for deteriorated patients include the social programme now accepted by all modern hospitals, for example, occupational and work therapy; physical exercises in the ward or in the grounds; social functions; cinema shows; dances, and coach trips. E.C.T., used either as a course, or as a maintenance treatment, was described by Moore (1943) and is widely practised. The newer drugs, Largactil and Reserpine enable progress to be made with many patients who were too restless or impulsive previously. The method of small group treatment, usually referred to as "habit training", is used with numerous variations. The "total push" technique of Myerson (1939) and other writers uses many different stimuli to encourage more activity and social re-adjustment on the part of the patient. The report by Sines (1952) and others showed that there was a significant, measurable, improvement as a result of their treatment programme in the case of long-stay patients, but found that on economic grounds it could not be applied to all patients who required it. They used group activities, E.C.T., encouragement of visitors and increased participation of nursing staff, but did not isolate which of these was the effective procedure. Wittkower (1955) has described improvement in a small group of schizophrenic patients who were allowed to play with dirt and who had some interpretation of their activities made. His report is very interesting, but whether the patients benefited from the permissive atmosphere, the interpretations made, the opportunity to achieve something, however low the level of achievement, or for other reasons, is not certain.

Reading published reports suggests that any method of treatment which leads to greater activity on the part of the patients leads also to some measure of improvement. Closer examination of the problem shows there is neither agreement on which activity is the most helpful, nor on what is meant by

improvement. Some reports suggest the discharge rate of patients from the long-stay ward is evidence of improvement, at least in social adjustment. The same result could, of course, be obtained by improved contact with the relatives of these patients without any change whatever taking place in the patient. Most reports use behaviour rating scales to assess progress, as these patients will not co-operate with any more formal testing procedure. There are many very serious difficulties in the use of all these scales, particularly if they are to be used repeatedly in an attempt to assess progress. Recording behaviour at once introduces another influence. For example, at this hospital it was decided to record the number of patients who were secluded in side rooms daily because of disturbed behaviour. For the first week of recording the average number in side rooms was 16 to 20, for the second and third weeks the number dropped to 7 or 8 and after a month to 1 or 2 and continued at that level. On the evidence it would seem that the simple process of recording the need for seclusion leads to prompt improvement in 90 per cent. of disturbed patients. The correct interpretation is that when extra attention is drawn to the patient in the side-room he receives treatment and the problem is resolved by this instead of seclusion. To take another example, it might be thought that a record of incontinence was at least a factual observation of behaviour. Unfortunately this is not so. Some patients are grossly incontinent, but others in quantities so small that it depends upon the nurse's keenness of observation and feeling towards the patient whether it is recorded or not. Also some patients will be continent when one nurse attends to them and incontinent when another is present. When patients realize that incontinence is being recorded and their behaviour observed they may make accurate records difficult by destroying or hiding evidence.

The Fergus-Falls Rating Scale (1951) is usually considered one of the better for use with deteriorated patients. Unfortunately this scale includes extremes of behaviour under the same rating, for example, under psychomotor activity the patient is given the same rating for "stays in one place unless moved", as for "may need seclusion for over-activity", so that this scale is hardly suitable for checking progress in either sphere. When this scale was validated a variation of one point on the scale was accepted as within normal limits. This means that "mute or speaks a lot, but nonsensical", or "a few words that make sense", were accepted as accurate descriptions of the same patient's behaviour. Others have tried to solve the problem of rating scales and Shatin and Freed (1955) described the Albany Behavioural Rating Scale which they consider an improvement on others. This scale, however, is most useful for one assessment of the patient, but less helpful if serial ratings are required to assess progress. It also includes many questions the answer to which will depend upon the interviewer's relationship with the patient, for example, "the patient is slow", "yells at aide when he is dissatisfied", "will discuss many subjects", "does any extra chore", will almost certainly depend upon the attitude of the person managing the patient.

Bennett and Robertson (1955) described the results of habit training on chronic schizophrenic patients but found that their methods of assessment were unsatisfactory. Their most definite conclusion was that further investigation was needed and that one of the major weaknesses of their enquiry was the subjectivity of their records and ratings, together with the unsatisfactory nature of behaviour charts completed by nurses. They suggest the use of the Fergus Falls Behaviour Rating Scale, but for reasons given earlier this too is unsatisfactory.

THE RESEARCH PROJECT

There are two major problems which require much further study. Firstly we need to know which of our present treatment methods are effective in the long-stay schizophrenic patient. Secondly, we need improved methods of assessing these patients and of recording the changes which result from treatment. The research recorded in this paper is an attempt to make progress with these two problems. Firstly it was decided to compare the effects of E.C.T., with those of "habit training"; as these are two of the most commonly used methods of treatment. It was possible to find a homogeneous group of deteriorated psychotic patients. All had been in hospital for more than 5 years and were on long-stay wards with other deteriorated patients. All were under 50 years of age and all showed gross evidence of a severe schizophrenic process. Fifteen had had a leucotomy, 4 insulin comas, and 31 a course of E.C.T. For the purpose of this research, patients were excluded if they had had any active physical treatment during the last year. They were placed in three groups by random selection, the principle being that they were placed in rank order depending upon the date of admission to hospital so that in each group the average duration of stay in hospital would be similar. (The average duration in each group was 15 years.) The patients were placed in three groups of 16 patients in each group. The first group was moved to a small ward staffed by a Sister and two nurses, where an active toilet training, physical exercise, occupation, and social activity programme, was instituted. The second group of 16 were given a course of 20 E.C.T. Owing to illness, two patients received 10 E.C.T. only, while others were found to benefit from maintenance E.C.T. and received between 20 and 30 treatments. The patients having E.C.T. remained on their usual ward and received no other extra attention. They were on wards with 60 or more other patients, looked after by a Sister with one nurse and ward orderly to help, so that extra time could not be given to them. The last group of 16 remained on their usual wards and received no fresh treatment or change in their routine.

THE BEHAVIOURAL RATING SCALE

A simple behaviour rating scale was used (Figure 1). It can be seen that this scale rates 16 forms of behaviour. The nurses were given an explanatory leaflet (Figure 2). The intention was to provide a chart which could be filled in quickly and with complete accuracy *so far as the facts were known to the nurse concerned*. This must always be considered. When a nurse is expected to rate a patient on her ward, if she has 60 or more patients under her care, the amount of accurate observation on any one of them is limited. The charts were completed for Monday to Friday of each week. They were scored by counting one, two, three, or four points, depending upon the four degrees of severity in each condition. This means that for any one factor over five days, the maximum score was 20, whereas if the behaviour was normal the score would be 0. The various grades of behaviour have been chosen arbitrarily, the emphasis being on accuracy of recording rather than upon equal grades of severity between each sub-division. It was found that the sub-division of aggressive behaviour into four categories was not helpful. Aggressive outbursts occurred sporadically in these particular patients and were directed towards anyone within reach. Contrary to expectation, this undifferentiated tendency occurred in all three groups and subsequently the scores from the last four sub-divisions were added together to give one scale of "aggressive incidents".

FIGURE 1

A.	Sleeps all day.	Dozes all day.	Dozes several times.	Dozes once.	Normal
B.	Light sleep. Wakes at night.	Light sedation (3-6 hours sleep).	Heavy sedation (1-3 hours sleep).	Insomnia, even with sedation.	
C.	Motionless.	Occasional movement.	Very retarded.	Slightly retarded.	
D.	Fidgety or meddlesome.	Needs light sedation.	Needs heavy sedation.	Needs isolation.	
E.	Tube fed.	Spoon fed.	Eats only with persuasion.	Finicky with food.	
F.	Greedy with own ration.	Greedy wants extra.	Voracious. Eats bad or stale food.	Eats things other than food.	
G.	Mute.	Occasional word with persuasion.	Speaks only if spoken to.	Occasional spontaneous remarks.	
H.	Pressure of speech—can be interrupted.	Pressure of speech—can't be interrupted.	Persistent conversation with or without audience.	Persistent shouting or singing.	
I.	Needs dressing fully.	Needs help in dressing.	Dresses self but needs adjustment.	Dresses self but dirty and untidy.	
J.	Incontinent of urine once.	Incontinent of urine several times.	Doubly incontinent once.	Doubly incontinent more than once.	
K.	Does no work.	Works with supervision in ward.	Works with supervision outside ward.	Works without supervision.	
L.	Has two friends.	Has one friend.	Has no friend.	No friends and avoids people.	
M.		Verbally aggressive to staff.			
N.		Physically aggressive to staff.			
O.		Verbally aggressive to patients.			
P.		Physically aggressive to patients.			

All patients were rated for one week on their original wards, before the treatment programmes began. After this the habit-training group were rated weekly, but because of nursing difficulties the other two groups were rated on the 5th, 9th, 12th, and 17th weeks. Graphs can be drawn from the scores given in Figure 3. An example of this is Figure 4, showing the changes in feeding behaviour.

Scale A shows the amount of sleeping or dozing recorded for each group. Less sleeping or dozing was recorded for the patients receiving habit-training and re-socialization and statistical assessment shows that the improvement is significant at the 5 per cent. level in the case of the habit-training group, but there is no significant change in the other groups. Although the nurses found this factor easy to rate, it is felt that this particular rating is too difficult to distinguish from factor C, for retardation. Many patients sit quietly in one

FIGURE 2
INSTRUCTIONS

The Ward Sisters should complete the form for each patient for Monday to Friday of each week. The patient's name, number, and ward should first be entered on the front. The form should then be completed each day by filling in the appropriate column, i.e.:

<i>Tube fed</i>	<i>Spoon fed</i>	<i>Eats with persuasion</i>	<i>Finicky</i>	<i>Normal</i>
	Monday	Tuesday Wednesday		Thursday
	Friday			

means that the patient needed spoon feeding on Monday and Friday, ate with persuasion on Tuesday and Wednesday and normally on Thursday. In general the lowest level of behaviour should be the one recorded.

Further Explanations

- A. *Sleeps all day* means that patient has to be woken for meals.
Dozes means that patient wakes spontaneously for meals or at intervals.
 Light sedation = 3 grains Amytal or 1 drachm paraldehyde.
 Heavy sedation = 6 grains Amytal or 2 drachms paraldehyde.
- C. *Motionless* means that patient only goes to meals if taken and otherwise stands or sits in one place all day.
Occasional Movement means that patient goes to meals if reminded and although staying in same place does move limbs or head occasionally.
Very Retarded means that patient occasionally moves from one place to another, but slowly and cannot be hurried.
Slightly Retarded means that patient's movements are much slower than those of normal people, but she can be hurried on occasions.
 Light and heavy sedation are as noted in A.
- I. *Needs help in dressing* means that without this the patient would leave some garments off.
Dress needs adjustment means that although all garments are put on by the patient, buttons need doing up or shoes tied or similar actions necessary to complete dressing.
Dresses self but dirty and untidy means that dressing is complete, but patient would not look neat enough to go out into the town.
- K. *Work* means any occupation whether O.T., Ward work, running messages, etc.
"Friends" means that there are patients with whom the patient prefers to sit at meals or is known to show a preference for, not necessarily that any deep friendship is present.
- M. *Verbally aggressive* means shouts at, swears at, or abuses.
 and *Physically aggressive* means hits, or throws at, whether the blows land or not, but does
- O. not include threatening to be aggressive.
 In both M and O 4=aggressive without any provocation whatever on more than one occasion.
 3=aggressive without any provocation on one occasion only.
 2=aggressive with slight provocation on more than one occasion if patient has to be verbally corrected by staff or is criticized by a patient.
 1=aggressive once.

If there are any further queries, please ask the Doctor.

These charts are part of an investigation into the effects of treatment on deteriorated patients and should be completed as carefully as possible.

position and appear to be dozing who are semi-stuporose and not sleeping at all. Also the apparent improvement in the habit-training group is probably due to the extra nursing staff, who can keep them fully occupied and therefore reduce the opportunity for dozing.

Scale B. The amount of nocturnal restlessness is significantly reduced in the habit-training group. Reference to the rating scale used shows that the amount of sedation given at night was used as a measure of assessment of the degree of nocturnal restlessness. Since it was a matter of principle in the habit-training group that all sedation was reduced as rapidly as possible both by night and day, this introduces a spurious impression of improvement. In the hospital as a whole there has been an attempt to reduce the amount of night-time sedation and this may account for the apparent improvement in the control group.

Scale C shows improvement in both the habit-training and E.C.T. groups. In the case of the latter it is not quite significant at the 5 per cent. level. Clinical observation suggests that an improvement in retardation is usually obtained in the case of patients receiving E.C.T., but the improvement in those having habit-training may be the result of the extra activity imposed upon them rather than the result of any fresh initiative in the patients.

Scale D. As in the case of nocturnal restlessness this factor was rated by using the amount of sedation given as part of the scale. Here again the apparent dramatic improvement in the first two weeks in the habit-training group is the result of the treatment policy rather than evidence of improvement in the patient group. Even though the improvement is significant at well beyond the 1 per cent. level.

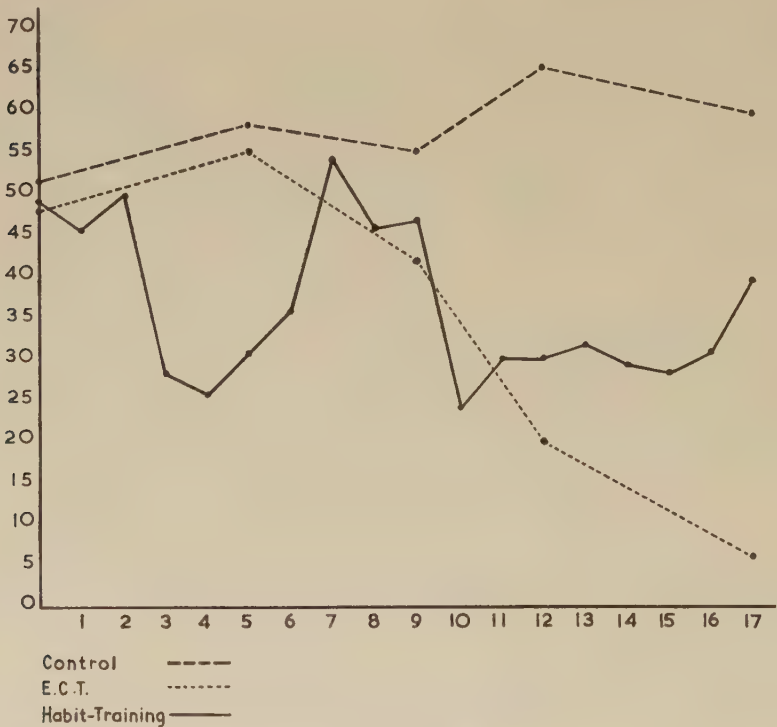


FIG. 4.—E. Feeding difficulty.

Scale E shows that there is improvement in the feeding of the habit-training group and in the group receiving E.C.T. In the E.C.T. group, this improvement is significant at the 5 per cent. level, and is the only factor which is statistically significant in this group. If the chart (Figure 4) is observed, it can be seen that in the habit-training group there is an apparent "hump" between the seventh and tenth weeks. Observation of this particular group suggests that this apparent deterioration in their feeding habits occurred at a time when the senior Sister and Staff Nurse on that ward went on their summer holiday and it is thought that the patients reacted to their loss by a relapse in their feeding habits. It can be seen there is a tendency to further relapse at the seventeenth week and this too occurred at a time when one of the senior nursing staff on that ward was on leave.

Scale F shows no significant change when tested statistically and the scores are not helpful. The group receiving E.C.T. varied considerably in the amount of greediness shown and no explanation of this can, as yet, be offered.

Scale G is concerned with difficulty in speaking. The analysis shows a significant improvement in the case of the habit-training group, but not in the E.C.T. group, even though the scores suggest that there has been improvement in this group too.

Scale H shows erratic changes in the scores. Statistically, no group shows a significant change. Examination of the scores shows that the group receiving E.C.T. apparently become much more noisy and talkative, while the habit-training group varied very markedly from week to week. Observation of the patients, particularly those in the habit-training group, has not led to any explanation of this phenomenon. It seems possible that the sudden increases which, in fact, usually involve relatively few patients, occur when one patient is noisy and provokes several others, so that for a short time a relatively high score is obtained. Discussion with the nurses suggests that this particular rating is more difficult for them to score objectively than others.

Scale I, which is concerned with dressing ability, shows a significant change at beyond the 1 per cent. level, in the case of the group receiving habit-training. This is of real interest and is probably the most significant finding in this particular group. Personal observation confirms that these patients, even though grossly deteriorated, can be trained to dress themselves and, what is more, will retain this training for some period even when not strictly supervised. It suggests, of course, that their previous level of deterioration was partly due to acceptance of a standard of behaviour, below their best possible level, by the nursing staff.

Scale J, for incontinence, is an interesting one, even though no statistically significant factor emerges. If the scores of the habit-training group are studied it can be seen that the maximum improvement occurs at the end of the third week, after which there is an increase in incontinence until the twelfth week, after which it again markedly improves, until there is maximum improvement at the fifteenth week. There are several possible explanations for this, but one which should be considered is as follows. When the experiment commenced the Ward Sisters understood that it was for a period of twelve weeks only. They were aware that the degree of incontinence in the patients was considered to be of importance and that we were most anxious to study and record it accurately. They were, in the first two or three weeks, very proud of the improvement which was obviously occurring and which they were recording in the habit-training charts. For the next four or five weeks the Sisters continued to state, in informal interviews, that the amount of incontinence was still becoming less as the weeks went by. They were not able to check their observations because the week's behaviour charts were removed at each week-end and they were unable to check back over the past weeks. It was, however, quite obvious, by the seventh and eighth weeks, that the amount of incontinence was increasing, even though the Ward Sisters still insisted they were achieving better results. During the tenth and eleventh weeks, however, the Ward Sisters began to complain, quite freely, that the amount of incontinence was on the increase and they felt it was very difficult to understand. At the end of the twelfth week they were told that, contrary to expectations, the habit-training group would be staying on the ward for another month. They were very pleased at this and the amount of incontinence over the next two or three weeks again showed very marked improvement. It seems possible that the incontinence occurring in these patients is a measure

of the mutual adjustment between staff and patients, the adjustment between their mutual expectations from each other, and the good feeling and morale of all concerned. In the case of the habit-training group the morale in the first few weeks was very high, but as the experiment proceeded, and the nurses began to feel that, after all, they would lose these patients at the end of the twelfth week, the morale slowly deteriorated and, corresponding with this, there was a slow deterioration in the toilet habits of the patients.

Scale K. In the case of the work status, there is a significant improvement in the case of the habit-training group. Several patients, who were previously idle, have been persuaded to do ward chores of one sort or another, but it has often been found very difficult to maintain any improvement achieved in this way.

It has been possible to train three patients to work in the hospital laundry. This means they leave the ward and are integrated into a working group. After a time it was found they continued to go to work without supervision and maintained their performance at work.

Scale L, recording friendliness, shows a sad situation. It is remarkable to see patients, who have been living in close proximity for several months, feeding at the same table, holding hands at the same game, walking together, playing together, dancing together, yet, once these activities cease, showing not the least interest or sign of awareness of each other, even though they may be standing or sitting next to each other. They can be seen wandering round from one side of the room to the next without speaking to each other or showing the least interest, even when another patient is involved in an incident. Lest it be thought that our standard of friendliness is too high it should be explained that any evidence that two patients showed any feeling for each other was accepted as friendliness in this context. For example, on one occasion two patients sat in the same corner and laughed heartily together for some minutes and this was recorded as a friendly gesture that day, even though subsequent observation showed that it did not recur.

The last scale, that for aggressiveness, appears on the surface to show that there is a marked increase in the case of those patients receiving E.C.T. Statistically, however, this is not significant, the reason being that the high scores are almost entirely accounted for by two or three patients, whereas in the group as a whole there is not any significant change.

To summarize the findings in the case of the sixteen original ratings. It can be said that those concerned with retardation, feeding difficulties, difficulty in speaking, dressing ability, incontinence, work status, and aggressiveness, can be used with the present method of scoring and rating. The factors concerned with nocturnal restlessness, day-time restlessness, and friendliness, require fresh rating scales if they are to prove of value. At present, linking restlessness with sedation does not give a useful scale, as the amount of sedation given depends upon the doctor and his attitudes more than upon the patient's immediate behaviour. It is probable also that the present rating scale expects too high a standard of friendliness in our patients. They rarely show friendliness to each other, but friendly gestures or attitudes towards the staff are sufficiently common to be worth considering as part of a rating scale. Lastly, it is suggested that the factors, sleeping in the day, greediness, and pressure of speech, should be discarded from the charts as being of insufficient value.

CONCLUSIONS

An experiment has been conducted to compare the effects of two methods of treatment for long-stay, deteriorated, schizophrenic patients. It was felt that

one of the chief failings of previous investigations of treatment for long-term, psychotic, patients has been the failure to isolate which of the methods used was effective. It was also thought that previous methods of assessment, including rating scales, had failed in their purpose, either owing to their complexity, or to the likelihood that major errors could occur owing to subjective factors influencing the rating scale. This experiment has shown that there are significant differences in the effect of habit-training together with re-socialization, compared with the effects of E.C.T., in this particular type of patient. The chief findings are that habit-training and an active programme reduce the amount of sleeping in the day, improve the difficulty in conversation, the ability to dress, and the patient's work status. E.C.T. although leading to some improvement in retardation does not do so at a significant level statistically, but does lead to a significant improvement in feeding difficulties.

A new rating scale has been introduced and data on its validity and reliability will be presented in a separate paper.

In conclusion it must be said that this research would have been quite impossible without the full co-operation given by numerous Ward Sisters, nurses, and other grades of staff, who, in spite of very heavy duties, have willingly given their time and energy in order to support this investigation.

RATING SCALES—STATISTICAL SUMMARY OF CHANGES (χ^2)

	Variable	Habit Training	E.C.T.	Control
A.	Sleeping in day	4.0*	.56	.06
B.	Nocturnal restlessness	4.0*	1.25	1.56
C.	Retardation	2.25	3.06	1.25
D.	Restlessness	14.0***	1.56	.06
E.	Feeding difficulty	1.25	4.0*	.56
F.	Greediness	2.25	0.0	.06
G.	Difficulty in speaking	5.07*	1.56	1.00
H.	Pressure of speech	1.00	1.00	1.25
I.	Dressing ability	9.0***	1.00	.56
J.	Incontinence	1.25	.56	1.25
K.	Work status	4.0*	.56	.06
L.	Friendliness	1.00	1.00	1.25
M.	Aggressiveness	1.00	.06	.06

* Significant at the 5 per cent. level.

** Significant at the 1 per cent. level.

*** Significant at beyond the 1 per cent. level.

All changes which are significant have changed in the direction of *lower* scores.

Statistical Analysis of Changes in Ratings after 17 weeks

The statistical analysis of behavioural changes was effected by the use of the Chi Square technique. In using this method the difficulties introduced by the flagrant lack of normality in the frequency distributions of ratings, which would render invalid any of the Critical Ratio techniques, were circumvented. In the present analysis we first set up the hypothesis that in each group of sixteen patients any changes in ratings from test to retest will be due to chance factors, i.e. eight patients can be expected to show improvement, and eight deterioration. The significance of the divergence of the actual numbers of patients within each group showing improvement or deterioration from these expected numbers is a straightforward χ^2 problem.

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A RESEARCH METHOD TO ASSESS A NEW TRANQUILLIZING DRUG

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I. INTRODUCTION AND PROBLEM

A NUMBER of new tranquillizing drugs have recently become available. We report a method of assessment for one of these—"Pacatal". In this experiment the new drug was compared with (i) no treatment at all, (ii) treatment using dummy tablets of the same size and appearance as the Pacatal tablets, and (iii) Largactil. A group of patients suffering from schizophrenia were selected, all being deteriorated. These patients can be found in considerable numbers with a reasonably similar clinical picture which is relatively stationary without treatment.

Pacatal, which is N methyl piperidyl (3) methyl phenothiazine, is said to be similar in action to Largactil but to produce fewer side effects. The ward sisters were informed of this and that we intended to assess its effects. They were told we would use two forms of the drug and did not know one was a dummy. All results were analysed statistically by the use of Analysis of Covariance. One of the most efficient experimental designs used in the evaluation of methods of treatment is the one employing "matched" or "equated" groups. In this design, patients are given an initial score on whatever criterion is being employed in the experiment, and groups of patients are then formed so that they show as nearly as possible the same distribution of scores on this criterion. These groups are then assigned to one or other of the methods of treatment under investigation and the final mean criterion scores for the groups evaluated at the close of the experiment. The chief drawback of this design lies in equating the groups of patients on the criterion before the experiment can be started, and such designs invariably involve considerable administrative inconvenience. To avoid this difficulty the writers have resorted to the device of matching at the close of the experiment, by the use of Analysis of Covariance. Briefly, this analysis allows us to test the hypothesis that there are no real differences between the methods of treatment, and that any differences in the final mean scores of the methods groups, after allowances have been made for chance differences in initial mean scores, are due entirely to chance fluctuations in random sampling. In this way, by allowing for these chance differences in initial mean scores, we hope to attain the same precision had the groups been matched on the basis of initial measures.

II. METHOD

(a) PATIENTS AND TREATMENTS

All the patients in this experiment were female deteriorated schizophrenics under 50 years of age. Their length of hospitalization varied from three to twenty-nine years, with a mean stay of fifteen years. Three long-stay wards in the hospital were involved, two provided 12 patients, and a third provided 24 patients. Mean ages are given in Table I. For each ward separately the names of the selected patients were arranged in order of length of stay in hospital. The first person on the list was assigned to treatment group A, the second to B, the third to C, the fourth to D, the fifth to A and so on. In this way the first two wards both had three patients and the third six patients in each treatment group. There were thus, in all, four groups of twelve patients, each group having a different treatment, A, B, C, or D.

Treatments were allocated at random as follows:

Treatment Group A	Largactil
Treatment Group B	Pacatal
Treatment Group C	No treatment
Treatment Group D	"Dummy" Pacatal

The selected patients received no treatment whatever for two weeks and at the end of that time they were rated by one of the authors (A.A.B.) on the Behaviour Rating Scale (Baker and Thorpe, 1956a, 1956b). They were also interviewed and rated on a five point tension scale.

The treatments were then administered according to the above plan for two weeks in the following dosages:

Group A	.. ..	50 mg. t.d.s.
Group B	.. ..	50 mg. t.d.s.
Group C	.. ..	No treatment
Group D	.. ..	50 mg. t.d.s.

At the end of this period, ratings on the Behaviour Rating Scale, and on tension, were again carried out by the same author, who in addition noted any side effects, and the drug and placebo dosages were then increased to 100 mg. t.d.s.

After two more weeks all ratings and assessments of side effects were again completed in the same manner.

Ward sisters were asked, after the first two weeks and subsequently after four weeks of treatment to give their opinions as to whether each patient had improved, deteriorated, or not changed since treatment began. We wished to note whether the sisters' impressions were the same from ward to ward, and considered whether this influenced the results.

Extreme care was taken to ensure throughout the whole experiment that the doctor who carried out the ratings had no idea at all to which group any patient belonged.

(b) CRITERIA

The criteria according to which the different treatments were to be assessed were as follows:

(i) *Schizophrenic Deterioration*

This is adequately described in a previous paper (Baker and Thorpe, 1956b) and constitutes the first general factor in the Behaviour Rating Scale

presented there. In the present study it is measured by the sum of the ratings on each of the ten Rating Scale items.

(ii) *Restlessness*

This constitutes the second factor of the Rating Scale which was also described in the same paper. In the present study it is measured by adding together the scores on the following items of the Rating Scale:

- (A) Night restlessness
- (C) Day restlessness
- (I) Aggressiveness

Scores on this factor of restlessness were previously shown to be independent of the deterioration measures.

(iii) *Tension*

This was assessed by one of the authors (A.A.B.) after a short interview with each patient, and scores from +++ to - were given on the basis of the patient's immediate reaction to the interview, her position in a chair, facial expression, and gestures with hands.

(c) STATISTICAL ANALYSIS

As indicated earlier, Analysis of Covariance was employed in the analysis of scores. As more than one ward was involved in the experiment it was possible to test not only the main effects, i.e. the methods, but also whether the interaction effects (Methods $\times$ Wards) were significant. In other words we could test whether for all patients involved, one method was superior to another, and also whether this superiority obtained in all wards.

In the analysis the mean scores of the four groups on each of the above criteria were compared with one another after two weeks of treatment, and again after four weeks of treatment. First the methods differences were analysed and when these were statistically significant, or approaching significance, the analysis of the interaction variance (Methods $\times$ Wards) followed.

III. RESULTS

The mean scores for each treatment group on each of the three criteria before and during the experiment, are given below (Table I). In all cases higher scores represent less adjusted behaviour, i.e. more deterioration, more restlessness, and more tension.

Analysis of covariance applied to these data gives the following results.

After two weeks of treatment with doses of 50 mg. t.d.s., and after a further two weeks at 100 mg. t.d.s., the F ratios (the reduced variance for Methods $\div$ the adjusted Methods $\times$ Wards variance) worked out as in Table II. (In all cases, with 3 and 5 degrees of freedom respectively, an F ratio of 5.41 is required for 5 per cent. significance.)

TABLE II

Criterion				F ratio (2 weeks)	p	F ratio (4 weeks)	p
(i)	Deterioration	..	..	<1.000	(NS)	2.269	(20%)
(ii)	Restlessness	..	..	3.983	(10%)	3.877	(10%)
(iii)	Tension	..	..	<1.000	(NS)	7.170	(5%)

TABLE I
Mean Scores

	Deterioration			Restlessness			Tension			
	Treatment Groups			Treatment Groups			Treatment Groups			
	A	B	D	A	B	C	A	B	C	D
Initial	12.917	14.167	9.583	1.833	1.000	1.667	0.000	0.417	0.083	0.250
After 2 weeks treatment	12.000	14.000	11.000	0.917	1.167	2.000	-0.167	0.333	0.333	0.500
After 4 weeks treatment	11.000	14.083	11.333	0.750	0.833	2.083	-0.333	-0.167	0.333	0.500
N	12	12	12	12	12	12	12	12	12	12
Mean age (years)	42.083	43.667	41.166	43.083	As for Deterioration			As for Deterioration		

Higher scores represent more Deterioration, more Restlessness, and more Tension.

TABLE III
Adjusted Mean Scores

	Deterioration			Restlessness			Tension		
	A	B	D	A	B	C	A	B	C
After 2 weeks	10.130	12.247	13.041	12.582	.501	1.544	1.743	2.131	2.053
After 4 weeks	..	..	..	..	.328	1.217	1.820	2.053	2.053
Difference between means required for 5 per cent. significance	..	..	..	..	1.237 (2 weeks)	1.400 (4 weeks)	..	..	..
	..	2.75	..	..	..	..	..	..	..

It will be seen from this Table that after 2 weeks of treatment at 50 mg. t.d.s., only restlessness has been affected to a degree approaching statistical significance. After 4 weeks, however, with increased dosages, all our criteria show changes which, if not completely acceptable statistically, are at least approaching statistical acceptability. It will, therefore, be instructive to determine which methods of treatment are responsible for these differences, even though some of them hardly reach the 5 per cent. level of confidence.

The following Table (Table III) gives the mean scores of the various treatment groups adjusted for initial chance differences on each of the three criteria. These adjustments are not given when the F is far from significant. In studying this table it may be assumed that all groups started out with the same average score. The amounts by which these adjusted means should differ in order to be significant are also given.

From this Table it will be seen that after two weeks the adjusted mean for group A (Largactil) in terms of restlessness is very much lower than the other adjusted group means. It is significantly lower than the means for both the no-treatment and placebo groups, and almost significantly lower than the mean for the Pacatal group. We may conclude from this analysis therefore, that Largactil and not Pacatal is responsible for the difference we saw earlier in Table II (a glance at Table I shows the Largactil group mean to be considerably reduced after two weeks and the Pacatal group mean to have increased), and therefore that in this experiment 50 mg. t.d.s., of Pacatal is not as effective as the same dose of Largactil in the treatment of restlessness.

We may now turn to the Deterioration scores after four weeks of treatment with increased doses. We saw earlier that the overall differences between the groups was significant at the 20 per cent. level. Table III suggests that again Largactil is mainly responsible for the difference between adjusted means, the Pacatal, the Pacatal Placebo, and the no-treatment group means being very close together, and there is an almost significant difference between the Largactil and Pacatal adjusted means in favour of Largactil. From Table I we see that Largactil has appreciably reduced the amount of deterioration, while Pacatal has left it unchanged. It is of passing interest to note from this Table that the no-treatment group appear to become slightly worse during the experiment.

The Restlessness scores after the same period of four weeks again suggest the same conclusion, and though, in this case, the difference between the adjusted means in Table III between Largactil and Pacatal is not significant, neither are the differences between Pacatal and Pacatal Placebo, and Pacatal and no-treatment, and once again Largactil is responsible for the biggest difference. Table I shows Largactil to reduce considerably the mean restlessness score.

Tension scores after four weeks of treatment show a slightly different picture. Here the Largactil and Pacatal adjusted means in Table III are very similar, and acceptable differences are shown by both these means when they are compared with the means for the Placebo and no-treatment groups. Table I shows that for both the Pacatal and Largactil groups tension is reduced appreciably, while for the two others an increase in tension is indicated.

As was pointed out earlier, the present design enables us to determine the degree to which these conclusions can be accepted as generalizations over the three wards in this study. This can be done by testing the significance of the interaction (Methods $\times$ Wards) variances, and it is considered to be extremely necessary here in view of notable differences in the attitudes of nursing personnel to the use of these drugs. It became obvious that the reports of Ward Sisters

on whether the patients had improved or not during the experiment seemed to be determined by their attitudes to the use of tranquillizing drugs. The Ward Sisters on the first two wards approved of tranquillizing drugs, while on the third ward (having half the patients in the experiment) they believed that habit training was more valuable. Any significant effects that these attitudes may have had on the patients' behaviour can be taken account of by testing these variances.

In this experiment there is in no case a significant interaction variance—all in fact are less than unity. The above conclusions, as a direct consequence of this, can therefore be accepted as applying to all wards.

Finally a note about side effects. Of the twelve patients receiving Largactil, four showed side effects after the first two weeks of treatment. These appeared as drowsiness during the first day or so of treatment, and later, skin rashes. Of these four, only two still showed skin rashes which had not increased in severity after a further two weeks under increased dosage of Largactil, ten patients remaining free from side effects. In the case of Pacatal, whether after two weeks of 50 mg. t.d.s., or after a further two weeks of 100 mg. t.d.s., no side effects whatever were apparent.

IV. CONCLUSIONS

There seems little doubt that Pacatal in the dosages indicated above is generally less useful in the treatment of deteriorated psychotic female patients under fifty years of age than Largactil given in similar doses. With a dosage of 50 mg. t.d.s., all treatment groups fail to show significant differences in respect of either deterioration or tension, and the difference between the groups in terms of restlessness appears to be due to the superiority of Largactil rather than to anything else.

When dosages are increased to 100 mg. t.d.s., differences between the groups begin to emerge. In terms of deterioration, and restlessness, however, these differences are again due to the superiority of Largactil over the remainder of the treatments. At this dosage tension appears to be reduced appreciably both by Pacatal and by Largactil, and the difference between them is extremely small. This finding, coupled with the earlier one that Pacatal produced no side effects are the only positive findings emerging in the present evaluation of Pacatal. Further research is needed to assess the value of Pacatal in other conditions and with varying dosage. The apparent deterioration in the control group may reflect the relationship between nurse and patient when the latter feel others are being given preference.

V. SUMMARY

The present study was designed to evaluate the usefulness of Pacatal in the treatment of deteriorated psychotic patients by comparing it with (i) a better known drug (Largactil), (ii) a placebo, and (iii) no treatment. The experiment was designed in such a way that the results could be analysed by Analysis of Covariance. The main experiment was duplicated in each of three wards in order to obtain as high a precision as possible. The results point to the general inferiority of Pacatal to Largactil except in the reduction of tension when the two drugs are equally efficient, and in the absence of the side effects so frequently found in patients receiving Largactil.

VI. ACKNOWLEDGMENTS

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THE USE OF ELECTROPLEXY (E.C.T.) IN PSYCHIATRIC SYNDROMES COMPLICATING PREGNANCY

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ELECTROPLEXY is now a widely accepted and used treatment in psychiatric practice. Primarily it is by far the most reliable means of terminating or resolving depressive attacks, months or indeed years before the anticipated remission of these illnesses on their own accord. Less commonly it is also regarded as an effective treatment in some schizophrenic states, particularly the acute type, or schizophreniform illness, "but actually most schizophrenics are treated at some stage of their illness with electrically induced convulsions" (Kalinowsky and Hoch, 1952). Neither depressive nor schizophrenic syndromes are infrequent in pregnancy and the question must therefore be posed in some of these complications whether electroplexy is justified; whether it can be used safely either alone or with relaxants; and what, if any, deleterious effects may be imposed on the mother and/or foetus.

Information about electroplexy in pregnancy is somewhat scanty. One well-known textbook (Diethelm, 1950) lists pregnancy as a contra-indication to electroplexy. Kalinowsky and Hoch (1952) review the situation under the heading of "contra-indications" in the chapter on "Convulsive Therapies" in their textbook of psychiatric treatments and rather paradoxically give two reports by Goldstein *et al.* (1941), who induced epileptic fits by metrazol without mishap, and Boyd and Brown (1948), who "surveyed the literature on E.C.T. in the gestational and puerperal periods . . . but found no serious damage to mother or child". The best known British book on physical treatments in psychiatry, by Sargant and Slater (1954), does not mention the subject at all. Mayer-Gross *et al.* (1954) in their "Clinical Psychiatry", only refer to the problem briefly: "Affective disorders during pregnancy have been successfully treated with convulsion therapy, without untoward effect on the course of the pregnancy or on the child", and give two references, Goldstein *et al.* (1941) and Thorpe (1942). Noyes (1953), under the heading of "contra-indications", says—"pregnancy is not usually considered a contra-indication . . . electric shock is a safer form of therapy than insulin in the psychoses of pregnancy".

The two papers which have given rise to reflection perhaps more than others have been the observations by Yamamoto *et al.* (1953) and the sequelae to a pregnant schizophrenic's treatment by insulin coma therapy published by Wickes (1954).

Yamamoto *et al.* (1953) described a pregnant woman who was given twelve electro-convulsive treatments about the sixth month of pregnancy. The labour was uneventful but when just over two and a half years the subsequent child was found to be definitely mentally retarded with no associated neurological signs. Although the authors at the time pointed out that they did not believe there was any connection between the treatment and the mental

condition of the child, nevertheless such an association produced subsequent interest and inevitable speculation.

Since anoxia is believed by some to be the operative therapeutic factor in the mode of action of electroplexy (McCowan, 1951), the case of hyperteleorism described by Wickes (1954) is of possible interest. Here was the case of a mentally defective child with hyperteleorism and optic atrophy who was born to a schizophrenic mother who had received insulin coma therapy from the second month of pregnancy. He suggested that the insulin, or possibly the anoxia induced by it, was responsible for the foetal defect—since hyperteleorism is due to a defect of the sphenoid bone occurring before ossification begins in the ninth week. Wickes felt that this time was very important and although shock therapy and epilepsy are said not to harm the developing foetus, nevertheless he quotes Boyd and Brown (1948) that there are no records of E.C.T. having been given before the tenth week.

In this connection, it is known that the foetus depends for its growth and development on an adequate supply of nutrients from the mother, particularly oxygen. It is known that a moderate deficiency over a short period may seriously injure the foetus (Ingalls *et al.*, 1950). When near term the foetus can survive a total lack of oxygen for about 30 minutes provided its circulation is intact, but it is doubtful if it will always escape completely unharmed (Brinkman, 1953).

Other views are much more precise and positive. Thorpe (1942); Polatin and Hoch (1945); Forssman (1955); Laird (1955); Russell and Page (1955); Charatan and Oldham (1954) have all given electroplexy to pregnant women and they consider such treatment justifiable and indeed safe. Forssman (1955) actually examined 16 children (oldest nearly 7, youngest nine months) whose mothers all had had convulsion treatment during pregnancy. None of the children was abnormal mentally and all were in good general condition. Apart from this particular article, however, and eight cases mentioned by Laird, all the other authors have described only one, two or rarely three cases.

From another angle, Clemesen (1927) and Burnett (1946) found little or no evidence of abortion or interference with labour as a result of fits occurring in known epileptics, although Burnett (1946) refers to one case where miscarriage occurred in an epileptic but points out that this was subsequent to a heavy fall during a fit.

From a consideration of these reports, therefore, there would seem little cause for hesitation; but the occasional report (e.g. Wickes's suggested correlation with E.C.T. and Diethelm's definite opinion that such treatment is contra-indicated), together with the striking absence of positive direction and amplification in standard textbooks (e.g. Kalinowsky and Hoch, 1952), suggested publication of a further 15 cases. All these patients received electroplexy at some stage during their pregnancy; any difficulties during the actual labour were watched for, and all the subsequent children were followed up to assess their general and mental growth and capacity.

INCIDENCE OF CASES REQUIRING ELECTROPLEXY

All cases here were seen over a five-year period in an acute psychiatric hospital. During this time, 3,173 patients were admitted to the female side of the hospital, so the incidence of pregnant women in this hospital requiring such treatment was only 15, or 0.47 per cent. There were of course many other pregnancies but other means, e.g. psychotherapy, change and manipulation of

environment, analeptic drugs, etc., were apparently sufficient to resolve any associated psychiatric complications.

RESULTS OF TREATMENT

Fifteen patients of ages varying between 18 and 35 years (mean 27.0) were considered in this study. Twelve of these were endogenous depressives or showed a considerable depressive component in their symptomatology. One was an acute schizophrenic reaction and another an exacerbation of a chronic paranoid schizophrenic syndrome. Each patient was given electroplexy according to her individual requirements, these differing little from non-pregnant cases. Thus, of this number ten had unmodified and five had modified treatment. The latter was invariably carried out with thiopentone and Brevdil E. (suxethonium). The details of the pregnancy and treatments can be seen in the following table.

TABLE

Case No.	Parous State	State of Pregnancy at Time of Treatment (months)	No. of Treatments
1	1st	4	6
2	1st	7½	6
3	2nd	7	7 (M)
4	2nd	3	6
5	2nd	2	6
6	1st	4	5 (M)
7	3rd	7½	4
8	3rd	5	5 (M)
9	4th	5	4 (M)
10	3rd	9	5
11	1st	7½	6
12	1st	6	5 (M)
13	1st	8	5
14	6th	4	6
15	1st	1	6

M=modified with Pentothal and Brevdil.

It is of interest that Case 7, whose pregnancy when treated was her third, had had two previous miscarriages at the 2nd and 3rd month. Case 9 was under close obstetric supervision, as she was Rhesus-negative and difficulties were thought possible as this was her fourth pregnancy. No precipitation of labour or any suggestion of a miscarriage was noted in any of these cases and indeed it was difficult to persuade Case 7 later that her subsequent successful labour with a normal child was not a direct result of the electrical treatment. In Case 2 there was prolonged labour, but from common obstetrical causes. The child was normal and certainly no psychological retardation or physical anomalies could be detected when he was aged 4½ years.

A follow-up of all the children born after this particular treatment had been carried out on their mothers during pregnancy was made. The mother and the child were interviewed personally and not only the mother's views of the child's development were noted but as objective a scrutiny as possible was made of these children at the time. All 15 children have been examined; the oldest was 5 years, the youngest 11 months. Not only was their state at the time of examination assessed, but their developmental history in relation to their upbringing

revealed no significant discrepancy or anomaly. Two of the children certainly showed neurotic traits—apprehension, shyness, timidity and undue sensitivity, but in each case the families were heavily loaded with neuroticism and there appeared little doubt that their present state was a characteristic result of a highly neurotic, unstable and insecure family environment. None of the 15 children, either at the time of examination or retrospectively as viewed by their development, showed any signs suggesting intellectual deficiency. None showed any physical abnormalities.

DISCUSSION

An annotation in the *British Medical Journal* of 16 April, 1955, under the heading of "E.C.T. in Pregnancy", notes that on enquiry of "eight experienced psychiatrists . . . all but one said that they had given E.C.T. during pregnancy but had hesitated to put the fact on record". The annotation goes on to say that "since the alternative to treatment is an intensely unhappy pregnancy with the possibility of labour and the puerperium in a psychotic state, and since severe depression in early pregnancy is sometimes considered as justifying termination, there would appear to be slight reason for hesitation".

This, together with the paucity of advice and amplification in most psychiatric textbooks on this question, prompted the present investigation, which it is hoped will be helpful in at least adding to the number of cases on record. It may also stimulate publication of any anomalous sequelae to such treatment, hitherto unknown. That the numbers involved are small can be easily seen from the figures given here, yet nevertheless it appears perfectly natural that one might pause for an appreciable time when confronted by a pregnant woman who apparently needs electroplexy. The hazards in pregnancy, although lessening as time goes by, still seem formidable enough without adding to them. Yet the lack of any untoward reaction in either mother or child in the present group as a result of this therapy seems to justify its use when the mothers are disturbed mentally. The results certainly tend to confirm the observations of Forssman (1955) and Laird (1955) and perhaps add to the literature two further cases in which electroplexy was given without any ensuing complications when the pregnancies were less than two months in duration. This latter is of importance, as Charatan and Oldham (1954), in a survey of 12 cases in the literature, speculated that "electro-convulsive therapy administered early in pregnancy . . . may well increase the risk of foetal injury".

SUMMARY

1. Fifteen cases are presented of pregnant women whose mental condition necessitated electroplexy at some time during their pregnancies.
2. Ten cases had unmodified treatment: 5 cases were modified with a relaxant and pentothal. No complications or difficulties ensued.
3. A follow-up showed no immediate complication either after the treatment or during labour. Furthermore all the children developed normally and none showed any evidence of mental defect or retardation.
4. The literature of E.C.T. in pregnancy is reviewed.

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PSYCHIATRIC USES OF MERATRAN

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MERATRAN (alpha-2-piperidyl benzhydrol hydrochloride) is a cerebral stimulant with an action not unlike the amphetamine series but differing in other respects in that it does not interfere with sleep, nor appetite, nor is its use followed by depression. It is not apparently a sympathomimetic drug, since it does not cause any marked cardiovascular pressor effects. Recent reports from America (1) have suggested that the drug is of use in treating patients suffering from depression and psychomotor retardation either due to mental illness, fatigue or a side-effect of other drugs, e.g. chlorpromazine or reserpine.

The author has carried out a controlled clinical trial with Meratran on forty chronic psychotic male patients in this hospital. The "double-blind" technique was used throughout, i.e. the patients were divided into two arbitrary groups one of which received the drug and the other a placebo for a period of four weeks and at the end of this time medication of the two groups was reversed for a further four weeks. Neither patients, nurses, nor investigators were aware of the group receiving the actual drug until the completion of the trial.

The constituents of the patient sample were selected because they showed depressive features, regression or retardation. They were practically all long-stay cases, the average length of hospitalization being $7\frac{1}{2}$ years. Most of the patients had been variously treated with insulin, E.C.T., chlorpromazine, and/or reserpine with little or no improvement. They were nursed in their usual wards, not grouped or segregated in any way and care was taken to interfere with the usual ward routine as little as possible.

Prior to the commencement of the trial all other treatment including sedatives was suspended. It was felt afterwards that those patients who had previously been on reserpine (11 in number) should have been rested for a longer period than a fortnight, as the absence of reserpine made itself felt amongst the placebo group for at least the first two weeks of the Meratran trial. It was also found necessary to re-introduce sedatives for those patients who became more agitated on the treatment.

The dosage of Meratran decided upon was 6 milligrams per diem, orally, in three divided doses after meals. The last dose was given at 6 p.m. and it was significant that no patient complained of difficulty in sleeping. Unfortunately the nature of the trial did not permit individual adjustment of dosage, as it is thought that the optimum dosage varies with the individual and can only be found by trial and error. From the results obtained in this investigation it would be probably advisable to start with 3 mg. daily and increase if necessary.

The nursing staff were instructed to observe the patient's mood, activity, conversation, interest and appetite, in addition to any change in psychotic symptoms. Short daily notes were kept by the nurse in charge of each ward and weekly summaries of these were made in addition to the observations by the medical officer. In particular notice was taken of the improvement or deterioration of the patients' adaptability to their surroundings, as evidenced by their ability to take part in ward-work, recreation, occupational therapy,

etc. Morning and evening pulse records were taken, and blood pressure levels, daily at first, were subsequently carried out less frequently. Weekly weight charts were kept and urinalyses performed. Complete blood investigations following four weeks treatment showed no abnormalities. No side-effects attributable to the drug were observed. Fabing (2) quotes narcoleptic cases having taken 100 mg. daily for more than a year without toxic effect. Dilatation of the pupils, sweating and flushing were not observed. No rise in blood pressure or pulse-rate was noted apart from the cases who had previously been on reserpine, and since the slight rise in both which occurred with these patients was present equally in the placebo group, it was probably due to the discontinuing of the former drug. Forster *et al.* (3) in a controlled trial with Meratran noted a mean rise in the pulse rate of the treated group of 9.1 beats per minute as compared with only 0.95 per minute in the placebo group.

The effects of Meratran appear very quickly. Subjectively patients reacting favourably describe an elevation of mood within an hour or so of the first dose. To the observer beneficial effects appear after a lapse of 48 hours, during which time in practically all patients a decrease in appetite occurs. Thereafter appetite improves, the patient is more alert in manner, the facial expression is animated, there is an increased awareness of the surroundings; the patient tends to initiate conversation with others, his capacity for ward-work and recreation is increased and signs of depression disappear. Undesirable effects appear equally rapidly, and if the treatment is continued, increase daily to a maximum in about a week. The most important of these is agitation. A depressed or schizophrenic patient with a tendency to agitation experiences a marked increase in this abnormal activity, sometimes presenting a picture of extreme tension, wringing his hands, and rubbing or tearing his hair. Lesser degrees of this agitation may be controlled satisfactorily with barbiturates, but in two cases it was necessary to discontinue treatment, when symptoms soon abated. Another contra-indication is the overtly deluded patient who experiences activation of delusional ideas, sometimes to an alarming degree. In one case treatment had to be suspended on account of this increased activation. It was not possible within the limits of this investigation to examine the effect of chlorpromazine or reserpine in combating these happenings, and it is intended to study the effect of such combined therapy in a later series. When a patient exhibits anxiety, agitation or delusions Meratran is contra-indicated and should be given with caution. Less noteworthy was increased abnormal activity such as pacing. Those patients showing unfavourable reactions also had decreased appetites and lost weight whilst on the drug.

RESULTS

The following Table shows the constituent diagnoses of the patient sample and the improvement rate.

TABLE

Type	No.	Improved	No Change	Worse
Schizophrenia	27	5	12	10
Senile Psychosis	5	3	1	1
Involuntional Depression	3	2	1	—
Neurotic Depression	1	1	—	—
Manic Depression	2	2	—	—
Epileptic Psychosis	1	—	1	—
Arrested G.P.I.	1	1	—	—
Total	40	14	15	11

The results in the schizophrenic group were disappointing. The patients were drawn from the chronic schizophrenics of the hospital population who had shown little or no improvement on previous treatment. The greater part showed marked personality deterioration, some were mute and withdrawn, and others hallucinated and deluded. In the case of the five who showed improvement this was limited to an appearance of alertness, a marked quickening of response to questions, an increased speed of purposeful action and a straightening of the bearing. Of those who became worse five were so classified because they were more agitated, deluded and hallucinated, and five who were withdrawn became more so, and required prompting to eat. All ten lost weight, the average loss being 8 lb. Schut and Himwich (1) reported seven out of ten "hebephrenic" schizophrenics improved on 5 mg. daily, but that paranoid and "hebephrenic" types with delusions did not improve. Fabing (2) reported that the response in patients with "ambulatory schizophrenia has been discouraging".

The thirteen remaining patients all showed depressive features. Of these, nine were improved, three unchanged and one worse. The patient who became worse was a senile with delusions, which were accentuated, and treatment had to be withdrawn. The nine improved patients all showed alleviation of depression, increased interest and activity and increased appetite after the first two days. Weight gain varied from 2-11 lb. Several of these patients were able to be usefully employed for the first time since admission. The two manic depressive cases who were in the depressed phase at commencement of treatment showed marked improvement while withdrawal of the drug caused a return of symptoms. This occurred with all the improved patients except that employment begun whilst on Meratran had been continued albeit with diminished enthusiasm. One patient suffering from involutional depression who was well improved while on Meratran was allowed home on leave at the termination of the experiment. His relatives report that his improvement is maintained and have since requested two extensions of leave. He had previously on several occasions failed to last a full week at home. Forster *et al.* (3) found a significant increase of activity without euphoria in 11 of 23 elderly psychiatric patients. Pomeranze (1954) reported favourable results with elderly depressed patients in geriatric practice.

The control system revealed one "placebo reactor". He was a schizophrenic who suffered from auditory hallucinations of a persecutory nature which he described as reduced in intensity whilst on chlorpromazine prior to this experiment. On control tablets he volunteered that the voices had ceased entirely. No further change took place on Meratran.

SUMMARY

The author describes a controlled clinical trial with a new anti-depressant on forty chronic psychotic patients. Beneficial effects were observed in those cases which exhibited depressive features without anxiety or a tendency to agitation. Patients suffering from delusional systems or hallucinations are not likely to improve. Whilst electro-convulsive therapy is the treatment of choice in acute endogenous depressive states Meratran may be found (a) to give relief of symptoms in chronically depressed patients where the depression is reactive in type, or secondary to senile change; or (b) to combat the lethargy induced by chlorpromazine or the depression following prolonged reserpine therapy. The results of this preliminary investigation would seem to justify further work along these lines.

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A NOTE ON THE FUTURE OF PHENYLKETONURIA

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THE new clan of treated phenylketonurics (1) cannot be assumed to be a happy one, or one with a high proportion of well adjusted individuals. Conceding for the moment that the phenylketonuric, if he sticks to his diet, will retain much of his intelligence, it is safe to predict that he will be miserable. One of his life's basic processes for satisfaction, his food, has been seriously tampered with, and replaced by a conflict. Eggs, milk, cheese, meat, fish, poultry, most fruit, even ordinary bread, are taboo for his table. He will consume a diet which will be cunningly prepared and flavoured, but he can hardly say that he "eats food". His fate is that the satisfaction—and the surcease—of incorporating various articles of food does not exist for him, or only in an attenuated form.

More than this, the legitimate diet permitted him conceals risk. He must plot a careful course between the Scylla of too little phenylalanine and the Charybdis of too much. Too little will lead to tissue breakdown, generalized amino-aciduria, and return of the old biochemical abnormalities (2). Too much will intoxicate his neurones and start his progression down the slippery slope of mental dullness. The margin for error in a given case may not be great.

So the act of eating, instead of being pleasurable, is beset with difficulty and anxiety of a degree which the diabetic, or even the obsessional neurotic, never encounters. Furthermore the phenylketonuric child will learn guilt as the response to natural appetite, while he is too young to appreciate that it is not his craving that is dangerous, so much as the medical progress which has landed him in his predicament.

How will the poor phenylketonuric handle these problems? Because he is not likely to be of exceptional intelligence or adaptability, it is not going to be easy for him to find satisfaction compensating for all this. The less stable ones will not need to turn to alcohol for oblivion to the burden imposed by medical science. All they have to do is substitute milk or some such beverage for the vine with which disappointed Omar Khayyam, in that profane poem, proposed to fill "another and another cup to drown the memory of this impertinence". They can cloud their consciousness on bacon and eggs. So the process of evolution, helped by medicine, presents us with a distinctive neurotic escape manoeuvre, which I have termed "Protein Addiction". No doubt we shall figure out a Greek name for it when the time comes.

I am not so artless as to believe that many people are interested in phenylketonuria, but most of us are interested, in theory at least, in preventive psychiatry, or mental hygiene as it is usually called. Those of us who have enough energy left over from our daily psychiatrizing to read articles on mental hygiene, may recognize two groups. The larger group stresses the value of improving child-rearing practices and family life. These are excellent and encouraging articles, even if their recommendations are vague. Presidential Addresses are in this group. The other, smaller group stresses inheritance, and morosely accuses

medicine of interfering with natural selection, and atomic radiation of interfering with the gonads, spoiling our heredity by stealth. Mention is made in the latter articles of the futility of Freudism (psychoanalysis is always called Freudism, perhaps to rate it with Lamarckism), and of man tinkering with his own destiny by means of absurd eugenic programmes.

So we find this two-fold approach to the problems of mental hygiene. As C. D. Darlington (1954) observes, the notions of heredity and environment have chased one another round the workshops of biology for a hundred years. What I like to point out is the curious divergence in emotional tone which exists between the two groups of articles.

The first group is invariably encouraging. The second is distinctly gloomy. Now it is hard to see how the facts of dynamic psychiatry make for optimism about the subject on which the facts of genetics make for pessimism. The explanation of this divergence may simply be that manic, cheery boys become dynamic psychiatrists and that depressive, fatalistic boys become geneticists and genetic psychiatrists.

THE ADVANTAGES OF THERAPY

This new treatment of phenylketonuria, beautifully but painfully, points up the old difficulties. In the literature of the subject we read of the advantages of the new treatment.

Dr. Woolf, Professor Moncrieff and Dr. Griffiths (1955) have summarized them for us. They comment on the low cost of the diet when compared with the benefit it will bestow. They write:

"The economic aspects of this form of treatment must be considered . . . The special dietary constituents . . . cost 10/9 a day at present prices. If all phenylketonuric aments came under treatment and some form of central manufacture of the special diet ingredients could be organized, the cost would fall considerably. The grades of many of these patients might be raised so that the ineducable became educationally sub-normal and the E.S.N. group might get accepted at ordinary schools. Later on, society may gain productive members."

As a footnote they add that, since their article went to press, the cost has been reduced to 7/4 per day.

An obvious difficulty in this programme—not, I think an insuperable one—is to diagnose enough infant phenylketonurics, that is phenylketonurics young enough to give the diet a reasonable chance. We know that if cretins are neglected in their early months, they have missed their chance of normal physiological and psychological maturation. The trouble with phenylketonuric babies is that, unlike cretins, they look normal and are not diagnosed until they reach an advanced age—such as 2–3 years—when it becomes obvious that they are defective. Very rarely, a phenylketonuric baby has the chance of being diagnosed if he already has a phenylketonuric sibling, and the family doctor is on the look-out for the condition.

Now with all respect to those working on the therapy of phenylketonuria, I want to suggest that it is not ideal to supply this expensive diet to four-year-old children, or even one-year-old children, when with a little additional ingenuity it should be possible to supply it to all phenylketonuric infants shortly after birth. This would involve testing all babies just prior to their departure from the maternity hospitals. A simple test consisting of ferric chloride splashed on a damp diaper, taking a few seconds to perform, and rarely requiring a confirmatory test, would be adequate. A large jar of ferric chloride solution could be kept in the foyer of the maternity hospital. Each infant could be

splashed on the diaper by the bell-hop just prior to the proud father taking delivery of what would then be a guaranteed non-phenylketonuric child.

Of course, the biochemist would first have to calculate that, by the time this graduation ceremony was held, sufficient phenylalanine in the form of milk had been ingested to ensure that the urine test of phenylketonuric babies would be positive. The hospitals supplying this service would for preference be large and situated in the U.S.A. because of the high incidence there. It would take time, but there is little doubt that sooner or later the phenylketonuric babies would be picked up. And in the course of a generation, thousands of phenylketonurics would be spared the usual belated diagnosis, and would have an opportunity of therapy in the vital first year of life. Well, these prospects certainly seem agreeable—but let us look at the disadvantages.

THE DISADVANTAGES OF THERAPY

The main catch in this delightful programme is that although society, in the words of Woolf and Moncrieff, "may gain productive members", their most notable product is going to be a steady supply of more phenylketonuria.

Phenylketonurics at the present time, because of their mental level, rarely have progeny; this causes a loss of phenylketonuric genes in each generation. If we assume that the incidence of the disease is in a state of equilibrium, there must be some counteracting influence keeping up the frequency of the gene in the human genetic pool. Otherwise it would disappear. This influence is two-fold. Mutation is one possibility. Slighter greater fertility of the carriers is the other.

With the advent of therapy, there will be three instead of two influences maintaining the gene in the population: mutation, greater fertility of the carriers, and direct transmission by phenylketonurics themselves. The progeny from the mating of a phenylketonuric and a non-carrier normal will all be carriers, though having normal phenotypes. Half of the progeny of a phenylketonuric and a carrier will be phenylketonuric, the other half carriers.

With this increasing frequency of carriers, the frequency of phenylketonuria now rises from its present low level until a new equilibrium is established, which depends on the success achieved by therapy, but more resembles the order of frequency of, say, red-haired individuals in the community.

In this account of the mounting frequency of phenylketonuria, we have assumed that mating is at random. This is unjustified; human mating does not take place at random. Marriages are between members of a social group, and, up to a point, between people living in the same area.

My opinion is that phenylketonurics will tend to form a relatively compact ingroup with a high proportion of intermarriage. Why? The affliction will draw the subjects together, much as deaf-mutes are drawn together and tend to intermarry. Phenylketonurics will come together in clinics, schools and treatment centres as children whilst they must be conditioned or disciplined to adhere to their diet, and the necessity for consuming the same artificial diet as adults will isolate the ingroup still further from homes in which a normal diet is served. Despite the good intentions of both ingroup and outgroup, meal-time social intercourse between phenylketonurics and normals will be inconvenient and even embarrassing. The phenylketonuric, like the vegetarian, will naturally prefer to consume his diet, other things being equal, in the company of somebody doing likewise. Yet another factor which may narrow the phenylketonuric's choice of a sexual partner to his peers is his decreased

intelligence, if we may assume that intelligence will not be perfectly restored by therapy.

So we will have intermarriage. Here is the rub: intermarriage between phenylketonurics will result in progeny *all* of whom will be phenylketonurics. Assuming general intermarriage, the frequency of phenylketonuria would double itself in the first generation after the initiation of treatment. Furthermore, unions between persons below the line in intelligence are above the line in fecundity, if only for the reason that dullards are not so smart with contraceptive devices. When we compared just now the frequency of the phenylketonuric gene in its new equilibrium to the frequency of the gene for red hair, the estimate was probably too low. For unlike the phenylketonurics, red-heads are presumably average in respect of intelligence and proficiency with contraception. Above all, red-heads do not form an ingroup prone to intermarriage. (I am prepared to grant that sexual selection, as far as I am concerned, operates favourably for the female red-head.) In this way the frequency of the gene for red hair remains at what we assume is an equilibrium. But intermarriage would speed up the rate at which phenylketonuria will reach what would be considered today a fantastically high incidence.

SHARP CONTROVERSY

This plunges us into the sharp controversy which sometimes exists between the ideals of preventive medicine and those of therapeutics. It is a controversy of ethics, and the medical practitioner is not obliged to take a consistent stand either for preventive medicine or for therapeutics, whatever the Hippocratic oath may say. Conceivably he can change sides, with different illnesses and different individuals in question. In the case of phenylketonuria he may consider, for example, that the possibilities of treatment are appalling, and that the disability at present produced by the untreated disease in the total population is slight, so that he is justified in withholding therapy, against the interests of the individual, but for the greatest good of the greatest number. There would, of course, be little point in figuring all this and withholding therapy, if the enthusiastic therapist next door were dispensing it.

What we will need here is some concerted policy for our guidance. The difficulty is, where are the wise men who will formulate the policy? Let us call on the geneticist. One expects the specialist in genetics to take a longer view of human suffering than the specialist in medicine, who has to treat the individual, if only to earn his living. The geneticist can afford the luxury of the long view. The following comments were made by a geneticist (3) before the advent of therapy in phenylketonuria gave the problem its newest piquancy. I am quoting them as representative of a line of thought which too occasionally blunders into the holy places of medicine.

"The full dangers of propagation unrestricted by disease were not realizable before the end of the nineteenth century. But Malthus' discussion suggested the idea of natural selection to both Darwin and Wallace. The dangers of genetic decay and the possibilities of genetic improvement had been indicated by Plato . . . To put the matter in another way: the limit to the population of men that the earth will carry is set by the physical character of the earth and the genetic character of men . . . The principle that is being applied to meet this crisis is the principle that the State—and even the World State—should accept responsibility for the nutrition, health and education of all human beings from

the time of conception to the end of life. This principle can be easily and immediately justified by the view that individuals who are not properly cared for in these respects are an incubus, and may be a danger, to society. But it is a principle with a corollary. The State of mankind cannot accept a responsibility which goes back as far as the fertilized egg without one day claiming the right to go further and control the quality or proportions of gametes which go to make the fertilized egg. Fertilization is, as we have tried to show, an important event. But it has antecedents. It is not so important that all responsibility should begin after it, and none be allowed before it.

"How this control can properly be exercised is the deepest problem that confronts humanity today. But, although deep it is not remote. If we fail to think it out quickly enough we shall be faced with the continuance on a grander scale of the old methods of preserving balance. We shall be faced with war, famine, and disease . . ."

What an eloquent warning this is! Even granting my earlier hypothesis about depressive boys becoming geneticists, we cannot discount its force. Inspired, can we claim "the right to go further and control" phenylketonuria? After all, the practical difficulties are not great. It would simply be a matter of deciding which of two devices to use:

- (a) not to treat it, or
- (b) to sterilize those treated.

But this sort of procedure is known as negative eugenics, and negative eugenics is repugnant to medicine at the present time. Admittedly it has a bad record, and perhaps the Eugenic Courts of the Third Reich are too fresh in our memories.

Even among the sincere attempts at negative eugenics, few if any have been founded on adequate knowledge. The sterilization of epileptics is the prime example. Forel, in Switzerland, suggested their sterilization on eugenic grounds as long ago as 1892, well before the rediscovery of the science of Mendelian genetics. In 1907 Indiana (U.S.A.) first introduced legislation for sterilization, and at present such laws exist in many states. The first European state to adopt legislation was the Swiss Canton of Vaud, in 1929. Denmark, Germany, Sweden, Norway and Finland followed shortly after (4). When eventually it was decided that idiopathic epilepsy does not possess the precise basis of heredity which had been assumed for it, the medical profession naturally became cautious of making wholesale negative eugenic recommendations.

Nevertheless the medical profession can overdo this caution. It is fair to say that the medical representatives of the eugenics movement have taken up a strong position—on the fence. Confronted by the increasing relaxation of natural selection brought about by medicine, of which phenylketonuria's example is the best (or worst) yet, they have become conscious as never before of the contra-indications to negative eugenics.

These contra-indications were summarized by a second professor of genetics (5) as follows:

- (a) Our ignorance of human genetics may induce us to make mistakes.
- (b) The problem of the dividing line; who shall arbitrate regarding sterilization of cases of moderate defect only?
- (c) The possibility of unscrupulous use of negative eugenics by certain ideologies—as with the Nazi party; "what coalition of minorities will decide what other coalition of minorities is undesirable?"

The professor concluded "Nothing I can think of could do the unfolding study of human heredity, with all its broad implications, more harm than premature

attempts to apply that knowledge in any dogmatic fashion to as complex an issue as man has ever tackled”.

Professor, had you phenylketonuria in mind when you wrote that? Your three deterrents do not deter us for long here. They could be answered in some such way as this:

- (a) The mode of inheritance of this condition is unusually well established. It would be unduly modest to say we were ignorant of it.
- (b) The dividing line does not exist between this condition and the normal. Either the condition exists or it does not. And, happily, a chemical test and not one of us psychiatrists, decides.
- (c) It is difficult to conceive of a political body with ulterior motives with respect to phenylpyruvic acid in the urine. The zeal and aggression which has characterized the eugenic movements of the past, is not likely to be invoked here.

If I may borrow as analogy from the author just quoted, the position of the physicians who treat phenylketonuria will be similar to that of the settlers who, in good faith but ignorant of the ecological disaster they are risking, introduce a pest such as the rabbit to a new country. Once the pest is established the strictest vermin laws may be ineffectual. Analogously, the simplest time to control the incidence of phenylketonuria—assuming we want to control it—is right now, before the problem reaches the proportions to which successful Bickel-Woolf type therapy will inflate it.

ENVOI

This is a new issue of an old coin.

I asked two colleagues to criticize it, which they did with genial vigour. Their objections and scepticism ought to be mentioned here, being important because of their frequent occurrence amongst medical men.

Colleague No. 1 said that it was not his place to doubt that the new therapy would do what its inventors claimed. What he doubted was that the medical profession would ever be silly enough to treat phenylketonuric infants in any numbers. He held the opinion that my warning was overdrawn, because, he said, “these things have a tendency to control themselves”. Euthanasia was unofficially practised, he said, despite the official dictum about it, and so, he said, doctors would “unofficially” tend to ignore infants with phenylketonuria and to provide no treatment.

That is what he said. I have only been able to think of three things that might explain it. Was he one of those cheery, manic boys who, on growing up to be psychiatrists remain blandly optimistic about the environment and unconvinced of the role of faulty inheritance? Well, I doubt if he was—he was wiser than the quarrel between the inherited and the experiential in psychiatry. Had he forgotten for the moment (though none knew of it better than he) the irresistible drive experienced by most doctors to be always changing people? Or—and this is the likeliest explanation—being a psychoanalyst he may not have had many defective patients lately. I replied that it would be an extraordinary mother who would agree to let her backward baby remain untreated, if she suspected treatment existed. And it would be an extraordinary physician who would not try the treatment (after it had been sufficiently brought to his notice on blotters in the morning post) and present his cases at the local clinical meeting.

Another metabolic variety of idiocy, cretinism, has been treated enthusiastically, though with variable results, since the introduction of thyroid preparations. I told him that there was no reason to think that our descendants would not be equally enthusiastic about treating phenylketonuria.

Colleague No. 2, whose opinion I sought, censured what he called an ironical, and even *ingenious* tone in these reflections. He said he smelt emotion, and not scientific impartiality as became a psychiatrist. He suspected that I was trying to reform a situation which did not yet exist. There must have been some justice in this; it hurt a little.

The medical or amateur geneticist has a sad dilemma. The physicians he buttonholes are often resentful or frankly incredulous that the face of medicine could change in the manner he suggests. The geneticists he buttonholes do not doubt this in the least, and are good enough to look perturbed about it, but are apt to be pained by his hearty plumbing of the depths of the human genetic pool.

Both parties must pardon the present amateur geneticist if, to illustrate the situation under discussion, he extends the metaphor of the human genetic pool. Let us say that out in its misty centre an oncoming tidal wave has been discerned. Is it possible to be impartial about tidal waves, to study the phenomena, with scientific detachment, from a comfortable chair on the beach? This position has disadvantages, even in the case of small and comparatively playful tidal waves such as phenylketonuria.

Physicians are going to stay on the beach anyway, ignoring the geneticists yelling on the cliff-top. In the case of a really masterful tidal wave, or succession of tidal waves (to mention schizophrenia only) this position may be as tenable as any other.

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SOME EEG FINDINGS IN OLD AGE AND THEIR RELATIONSHIP TO AFFECTIVE DISORDER

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INTRODUCTION

THE significance of the electro-encephalographic variations found in old age is not well defined and hence the value of this form of investigation as a prognostic measure is doubtful. Apart from a few papers such as Mengoli (1952), Mundy-Castle *et al.* (1954) and Obrist (1954), most of the published work contains no reference to findings obtained from a control series of persons of similar age and not suffering from a definite disability. This absence of definite criteria in respect of the EEG findings in records taken from apparently healthy elderly persons is important both as regards clear-cut abnormalities and also in reference to minor variations of doubtful significance.

The purpose of this paper is to evaluate the significance of the EEG findings in apparently healthy and normal persons aged 60 and over, and to compare these results with those obtained from a group of similarly aged patients suffering from a depressive illness. It was hoped that in this way these depressions of late onset might be differentiated from those arising earlier in life, with the possibility of determining in part the aetiological causation and clarifying the natural history of depressive illnesses. Interest in this subject has already been aroused by the work of Mayer-Gross (1945), Roth and Morrissey (1952) and recently Roth and Kay (1956), in which the importance of affective psychosis in old age is stressed.

A shift of the prominent components in the EEG towards the slow end of the frequency spectrum (Davis, 1941) and an increase in the amount of slow wave activity in persons over 70 years of age were the first changes to be noted. These findings were confirmed by Obrist (1951) in males aged over 75. A direct correlation between the severity of EEG abnormality and the degree of mental impairment in elderly patients has been found by some workers. Hoch and Kubis (1941) stated that if 1-5 c.p.s. slow waves were present so was mental impairment. Luce and Rothschild (1953) found only 12 per cent. abnormal records in those with functional psychiatric disorder, as opposed to 75 per cent. in those with an organic condition. Similarly, McAdam and McClatchley (1952) found very few abnormal records in psychiatric patients over 60 who were not clinically deteriorated, with a close correlation between the degree of marked deterioration and EEG abnormality.

However, the poor correlation between the EEG findings and the degree of organic mental impairment has also been frequently noted. For instance,

Liberson and Seguin (1945) found that one-third of definitely organic patients have a normal or borderline EEG record. Strauss and Greenstein (1948) found no direct relationship between the EEG normality or abnormality and the presence or absence of severe cerebral lesions. Silverman *et al.* (1953) found only 53 per cent. normal records in a group of elderly persons suffering from a variety of medical and surgical conditions but who had had no vascular accidents. Sheridan *et al.* (1955) stressed that records taken from persons in the senium often change in a few months, either for better or for worse, and that anyway good intellectual function is compatible with an abnormal tracing.

Bagchi *et al.* (1950) found that patients with very high blood pressure were more apt to have abnormal records, but most of these had either had a cerebrovascular accident or hypertensive encephalopathy. However, if these were omitted the correlation was poor and 42 per cent. had normal and 33 per cent. borderline with only 25 per cent. abnormals. Cohn (1949) noted predominantly high frequency activity and only rarely slow activity in patients with increased arterial blood pressure.

MATERIAL AND METHODS

Control Group

This consisted of 82 persons (63 females and 19 males). They were living independently of any sustained medical help and were drawn from all social strata. Each could be said to show "social integration".

The following examinations were carried out on all these individuals:

- (a) Psychiatric assessment, including general information and conceptual tests, so arranged as to reduce to the minimum the likelihood of fatigue.
- (b) Simple clinical memory test, comparing recall for recent and remote events.
- (c) Fundus and disc examinations.
- (d) Blood pressure estimation.
- (e) An EEG.

In addition to this the following information was obtained:

- (f) Full previous medical and where applicable psychiatric history.
- (g) An evaluation of social circumstances.
- (h) Present state of sight and hearing.

Fundus and disc gradings were attempted using the criteria of Wagener and Keith (1939). Two blood pressure readings were recorded, one before and the other after interview and the second reading was used for the purpose of our investigation. A rough estimate was made of the emotional state present, so that anyone with obvious evidence of psychiatric illness could be excluded. Our social workers confirmed and assessed the social state, as any individual showing evidence of social isolation and particularly any not living an active and independent type of life was excluded.

Group suffering from a Depressive Illness

Ninety-six cases of depression (65 females and 31 males) arising in patients aged 60 and over were examined. "Depression" in this investigation has been taken to mean a depressive symptom-complex sustained for a period of over three weeks. In view of the possibility of organic brain signs materially influencing our results, the following types of case were excluded:

- (a) Any with a possible history of cerebrovascular accident.
- (b) Mixed cases in which there was evidence of both depressive and organic symptoms.

- (c) Those cases of depression associated with damage to the C.N.S., e.g. an old hemiplegia or Parkinsonism.
- (d) Those cases of depression who had E.C.T. within three months of examination (for, say, a previous depression).
- (e) Those patients known to have made a suicidal attempt with carbon monoxide.

The present series has been subdivided into two main groups:

- (A) Those cases in which the first attack occurred before the age of 60 (the early onset group), total number 47;
- (B) A late onset group in which there was no evidence of depression before 60, total number 49.

This subdivision was decided upon to see if depressions of later onset, which might be considered to be of less good prognosis, showed EEG or other symptom differences as compared with the group of earlier onset.

EEG Interpretation

All the EEGs were evaluated by one of us (E.C.T.), who had no knowledge of the clinical group. Records were taken on an 8-channel Ediswan electroencephalograph, using standard electrode positions and a bipolar recording technique. Only those that were technically satisfactory were included. With regard to provocative procedures, results of overbreathing are not considered, as many subjects could only increase their respiratory exchange slightly. Photoc stimulation was the only other technique routinely employed and the results are given separately.

The EEGs were all interpreted according to a fixed plan decided in advance. The records classed as normal were judged by ordinary adult standards and the alpha rhythm had a frequency of 8.5 c.p.s. or over. The borderline records were those showing an excess of fast or beta activity, with either a diminution or abolition of the alpha rhythm. The truly abnormal records all showed an excess of slow activity or epileptic features. Where these slow rhythms were generalized, the abnormality was graded as moderate or severe and in addition those tracings showing focal disturbances and epileptic features were separated.

RESULTS

Clinical Details of the Depressive Groups A and B

Social and environmental stress varied little in its incidence in the two groups. In approximately 21 per cent. of cases of Group A (10 out of 47) stress was present, whilst in Group B the figure was 17 out of 49 (35 per cent.). Physical disease seemed to play an important part in both groups either in precipitating or aggravating an attack of depression. Thus in 29 of the 96 cases (32 per cent.) the physical state was held to be an aetiological factor.

There was little difference in the end result of hospital treatment in the two groups. Thirty-nine out of 47 (87 per cent.) of Group A recovered, whilst the figure in Group B was 33 out of 49 (75 per cent.), the difference being well below the 5 per cent. level of significance. The recovery appeared to be spontaneous in 16 out of the whole series of 96. Further analysis of the individual clinical factors was considered to be beyond the scope of the present study, particularly in view of the exclusion of the categories described above and the distribution of the EEG abnormalities shown below.

EEG Findings

The normal EEG records (Table I) are evenly distributed between the control group and that of the depressives whose illness commenced before the age of 60. The percentage is rather lower in the groups of those with depression arising after 60, but the difference is not significant at the 5 per cent. level. The borderline records, i.e. those with an excess of fast activity, are noteworthy in their prominence and the evenness of their distribution. From this it can only be surmised that this is a general ageing phenomenon. The group of patients suffering from a depression arising after 60 showed the highest proportion of truly abnormal records (39 per cent.). However, this finding is not significant when compared with the abnormal records in the control group and only just significant at the 5 per cent. level when compared with the depressions of later onset. At the most this can only suggest a trend towards abnormality in the depressive Group B. Table II shows the different varieties of abnormal record encountered. Perhaps the most interesting finding is that in the control group, 4 showed severe generalized slow wave changes and the same number a definite slow wave or delta focus.

TABLE I
EEG Results Found in the Three Groups

EEG Type					Group			Totals
					C	A	B	
Normal	..	..	..	..	38	25	18	81
Borderline	..	..	..	..	23	13	12	48
Abnormal	..	..	..	..	21	9	19	49
Totals	..	..	..	..	82	47	49	178

Groups: C=Controls.

A=Depressives of early onset.

B=Depressives of late onset.

TABLE II
Analysis of the Abnormal Records Found in the Three Groups

EEG Type					Group		
					C	A	B
Diffuse slow changes:							
Moderate	..	..	..	..	13	5	11
Severe	..	..	..	..	4	1	6
Focal slow changes	..	..	..	..	4	1	2
Epileptic	..	..	..	..	0	2	0
Totals	..	..	..	..	21	9	19

The three groups were then compared as to age (Table III), being divided into two groups, 60-69 years and 70+. There is no indication at all that, within these limits, increasing age is a significant factor in the production of EEG abnormality.

The influence of blood pressure, both systolic and diastolic, was also considered, first on each of the three groups and also on the whole. Table IV shows

TABLE III
Effects of Age on EEG Results

EEG Type	Age 60-69 Years					Age 70+ Years				
	Group			Total		Group			Total	
	C	A	B			C	A	B		
Normal	21	21	12	54		17	4	6	27	
Borderline	9	11	11	31		14	2	1	17	
Abnormal	11	6	17	34		10	3	2	15	
Totals	41	38	40	119		41	9	9	59	

TABLE IV
Comparison of Systolic Blood-Pressure Levels in the Three Groups

EEG Type		B.P. Level—Systolic									Total C+A+B
		Under 170 mm./Hg			170-189 mm./Hg			190+ mm./Hg			
		C	A	B	C	A	B	C	A	B	
Normal	..	17	13	8	5	8	7	16	4	3	81
Borderline	..	8	7	10	6	1	1	9	5	1	48
Abnormal	..	8	4	13	6	3	3	7	2	3	49
Totals	..	33	24	31	17	12	11	32	11	7	178

the results for the systolic pressure. In none of the three groups, nor when the total findings were added together, was there any indication that a raised diastolic or systolic blood pressure could be related to EEG abnormality. In fact many patients with gross hypertension had perfectly normal records. Conversely a blood pressure within the normal range did not increase the likelihood of obtaining a normal tracing. We accepted the fact that in all three groups, despite the precautions taken, some part at any rate of the increased blood pressure may have been due to emotional factors.

It seemed to us important to consider the relationship between outcome of treatment and the type of EEG record. Accordingly a series of patients with abnormal records was compared with a group showing wholly normal records. An arbitrary group was used, taking each patient with an abnormal record and using the patient with a normal record next on the list alphabetically for the other group. In the abnormal group of 25 patients 8 (6) did not improve whilst 17 (19) did. There is no significant difference in the results obtained from patients with normal and abnormal EEGs, as the numbers in parentheses show. This suggests further evidence that the EEG abnormalities noted above are the changes of a genuine ageing process rather than characteristic of any individual disease.

Photic stimulation evoked abnormalities which could be considered epileptic in 7 cases (9 per cent.) in the control group and 11 (11 per cent.) in the depressive group, with the changes being especially marked and showing generalized seizure patterns in 6 and 4 cases respectively. These results probably do not indicate any increased likelihood to clinical epilepsy in either group but they do underline the questionable significance of this method of diagnosis unless substantiated by further abnormalities.

CONCLUSIONS AND COMMENTS

The results obtained emphasize the essential need for a carefully controlled experiment. All abnormalities in patients must be seen in the perspective of those found in the controls, e.g.—focal or generalized slow wave activity was present in no less than 21 cases (26 per cent.), a figure not markedly different from that found in the whole group of depressives, 26 (27 per cent.). These figures, however, differ widely when contrasted with the number of abnormal records found in younger persons suffering from a depressive illness. One of us (Turton, 1954) found that in a group of 125 persons suffering from an endogenous depression, only 9 (7 per cent.) showed any abnormality in their record of any kind, but in a group of a further 125 persons suffering from an involutional type of depression 14 (13 per cent.) showed a definite excess of slow activity.

Similarly, borderline records are few in the younger age groups but in the work cited, 39 (31 per cent.) of the involutional depressions showed a complex type of record with an excess of fast activity, very comparable to our findings of 24 such records (29 per cent.) in the control group and 25 (26 per cent.) in the total depressive group. Greenblatt (1944), Finley (1944) and Obrist and Bissell (1955) all found about the same percentage of persons with an excess of fast rhythms in this age group.

We postulate that these records represent a phenomenon of ageing and are not in fact causally related to either an involutional depression or an early organic dementia, and further that both the borderline records and those with an excess of slow activity should be largely neglected in assessing the prognosis of any individual case. Thus, although the EEG may be of value occasionally in determining the likelihood of clinical epilepsy supervening, as a general rule persons suffering from an affective disorder in the senium may or may not have an abnormal EEG, quite irrespective of the prognosis. Anyway, a considerable proportion of apparently socially well-adjusted elderly persons showing no definite organic deficit will have records of this kind.

Obrist and Bissell (1955) put forward the interesting hypothesis that the EEG abnormalities found in patients with cardiac and cerebrovascular disease could be related to poor cerebral circulation associated with anoxia and metabolic disturbance, with resulting slow or delta activity in the record. The process being reversible accounts for the fact that an abnormally slow record can, and fairly frequently does, return to normal. It seems to us probable that most of the EEG changes in old age are related to changes in cerebral circulation and are symptomatic, perhaps, of a disorder of function, often slight, rather than any irrevocable disruption of brain tissue.

SUMMARY

1. Persons over 60 years of age, who were leading a normal home existence, were examined clinically and electro-encephalographically.

2. The results obtained from these persons were compared with those from a group of depressive patients, these being divided into those whose initial illness started before the age of 60 years and those in whom the onset was at this age or later.

3. No definite difference in the record type was noted between these two groups and the control subjects, although there was a trend towards more abnormalities in the group arising at the age of 60 or over.

4. The blood-pressure level and the age of the patient when the record was taken, within the limits investigated, had no effect on the type of EEG or the percentage of abnormalities.

5. The considerable number of abnormal records and large number of borderline records found in all the three groups is probably an expression of a general ageing process and not limited to any one specific symptom complex or disorder.

6. Various clinical factors are discussed in relation to the two groups of persons suffering from a depressive illness and there was a trend for the early onset group to show a better response to treatment, although this was not significant statistically.

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SENILE INTELLECTUAL DETERIORATION AND THE ELECTROENCEPHALOGRAM: A QUANTITATIVE CORRELATION

By

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INTRODUCTION

THE association of abnormal low frequency rhythms in the EEG with intellectual deterioration in old age has now often been described, but there has been no clear indication of a quantitative correlation between the degree of abnormality of the EEG and the severity of the deterioration. The present paper describes an attempt to explore the possibility of the existence of such a quantitative correlation.

METHOD

Case Selection

There are many disorders in old age which are accompanied by intellectual impairment, and many of these disorders affect the EEG. It was considered essential, therefore, to adhere to a rigid case selection. Only cases showing a simple deterioration affecting all accessible aspects of the personality were investigated. A typical case would be that of an individual of over 70 with a history of mental illness starting at or after the age of 65 years, subsequently showing gradually progressive disintegration of the intellect and personality of such degree that he was no longer able to deal satisfactorily with his life situation: whose physical state was deteriorating although there was no sign of focal, neurological or gross cardiac or renal failure or conspicuous disease in any system; and who showed some degree of impairment of memory, orientation, insight, intellectual ability and social adaptation and behaviour. We decided to reject, for example, cases showing presbyophrenic features, i.e. those in whom there was a striking discrepancy between a reasonably well-preserved social façade and a severe degree of intellectual impairment; hemiplegias, dysphasias and epilepsies; cases with a suspicion of psychotic illness other than that of simple senile deterioration, for example the depressions, paranoid states and the presenile dementias; and major endocrine disease such as diabetes mellitus or subthyroidism. As far as was possible we sought to restrict the group to cases in which the significant variable was the degree of deterioration in ability to adapt to the environment. It is to be noted that in preliminary studies it was not found possible to distinguish, by means of the pattern of the disability, between senile and arteriosclerotic forms of intellectual deterioration. We do not here take any sides in the question of whether or not the distinction is a valid one. If it is so our series is presumably loaded in the direction of a preponderance of the senile type, since we had resolved to exclude cases showing evidence of focal neurological disorder; otherwise our use of the

expression "senile intellectual deterioration" is not, in this paper, to be taken as implying an exclusion of the arteriosclerotic type.

Clinical Evaluation

A preliminary report on a smaller group than that here studied has been published (Robinson, 1954) and those aspects of the clinical examination to which attention is paid in reaching a numerical evaluation have been fully described. The following is a list of those items, with brief notes on some. In the first group below, for each item to which a good response was obtained, a mark was awarded. There were of course many occasions on which partial or imperfect responses were given and scoring by half marks was used.

1. *Temporal orientation* was considered in orthodox fashion by asking the date, month and year.

2. *Estimate of the patient's own age.*

3. *Duration of stay in hospital* gave indication of recent memory.

4. *Remote memory* required place and date of birth, and school.

5. *Status* involved at least an appreciation that he was in "a place for looking after folks".

6. *Appreciation of Interview Situation* gave an indication of insight, as did in a different sense

7. *Appreciation of failing faculties.*

8. *Rapport.*

9. *Attention.*

10. *Concentration.*

11. *Knowledge of current affairs.* Local sporting news was accepted.

12. *Serial subtraction of sevens from a hundred.*

13. *Pennies in a shilling.*

14. *Threepennies in a shilling.*

15. *Threepennies in three and ninepence.*

16. *Activity and productivity* had to be purposeful: not just aimless restlessness.

17. *Habits* as to feeding, toilet, sphincter control.

Each of the following four, if present, lost him a mark from the above score.

18. *Confabulation.*

19. *Emotional lability.*

20. *Confusion under stress* (e.g. of the interview).

21. *Misidentification of relatives* or of the regular ward staff.

Much of the above had to be discussed and verified with the nurses: in particular 16, 17, 18, 19 and 21.

EEG Evaluation

Standard recordings were made with an Ediswan 8-channel instrument, using an alpha band-pass filter (Morris and Dawe, 1953) in order to obtain a clear picture of the alpha rhythm. The microvoltage of the alpha was used as a standard by which to assess the relative amount of low-frequency activity in the record.

The records were placed in a linear order of increasing abnormality, based on a visual assessment. It was not difficult to place records in categories of slightly, moderately and severely abnormal: and within these categories to rank them. In general the amount of low frequency activity was the principal

consideration, but various other features such as abnormal microvoltages and abnormal wave forms, slowed alpha or poly-rhythmic alpha and so on, were also considered when they were observed. An attempt was made also to obtain a numerical value for the amount of low frequency activity. The indices of theta and of delta activity (i.e. the sum of the duration of each theta or delta wave in a given space of time, recorded as a percentage) were obtained by direct visual measurement from several thirty-second epochs in each record. The average microvoltage of these waves in one thirty-second epoch was assessed, again by direct measurement. These measurements were relatively easy to make in the more abnormal records but were laborious and doubtful when there was a large amount of alpha and faster rhythms present, and especially when these were in higher microvoltage than the low frequency waves and superimposed on them. The band-pass filter made the measurement of the microvoltage of the alpha rhythms a simple matter.

From these measurements an index of the energy output of low frequency activity was obtained thus:

$$\frac{\text{theta microvoltage}}{\text{alpha microvoltage}} \times \text{theta index} + \frac{\text{delta microvoltage}}{\text{alpha microvoltage}} \times \text{delta index}$$

In the majority of cases the abnormalities were widely distributed over the hemispheres. In three cases they were sharply localized in the temporal areas. Arbitrarily these were assessed as if they had been generalized.

General

The EEG's were studied by one of us (W.McA.) in complete ignorance of the case, the records being taken by a recordist who stored them and delivered them in batches with no other information about the patient than a name. The clinical study was made similarly by the other (R.A.R.) without knowledge of the EEG which was neither shown to him nor reported on until some months after the clinical evaluation had been recorded.

RESULTS

The table shows the measurements of alpha, theta and delta rhythms from which the index of low frequency activity is derived; the age, and the clinical score. The order in the table is that of the rank order of increasing abnormality of the EEG by visual assessment. It is divided between 15 and 16 and between 31 and 32 into slightly, moderately and severely abnormal from the point of view of the EEG.

No significant difference between these three groups was found in respect of age—81·93, 82·38 and 79·05 years respectively—using Student's *t* test.

Figure 1 is a scatter diagram which shows a trend of conformity between the rank order of the EEG by visual impression and the clinical score—the worse the EEG the lower the clinical score. The coefficient of ranked correlation = 0·79 (*P* 0·001) which is significant at the 0·1 per cent. level of confidence.

Figure 2 shows the relationship between the index of low frequency activity and the clinical score. Again there is conformity: the more low frequency activity there is, the lower the clinical score. Assuming a linear regression, the product-moment correlation = 0·65 (*P* 0·001) significant at the 0·1 per cent. level. In order to show this correlation on a graph, the square root of the index of low frequency activity was taken. Without taking the square root, the significance works out slightly higher.

Rank Order of EEG Abnormality	Clinical Rating	Age	Mean μ V.			θ Index	δ Index	Standardized Low Frequency Energy Output
			α	θ	δ			
Slight EEG Abnormality:								
1	16 $\frac{1}{2}$	83	11	10	—	20	—	4.2
2	14 $\frac{1}{2}$	71	11	20	—	16	—	5.4
3	9	79	20	17	12	12	tr.	3.3
4	16 $\frac{1}{2}$	81	25	14	—	12	—	2.6
5	6 $\frac{1}{2}$	80	35	25	20	8	7	3.2
6	14	88	40	17	10	20	12	3.3
7	12	82	12	20	10	20	tr.	6.1
8	9	81	27	20	20	8	16	4.2
9	11	82	55	40	40	25	20	5.7
10	3	85	50	25	—	15	—	2.7
11	9	85	25	15	—	20	—	3.5
12	13 $\frac{1}{2}$	82	25	25	25	11	11	4.7
13	3 $\frac{1}{2}$	89	47	45	40	16	13	5.2
14	6	83	25	25	25	25	16	6.4
15	10	78	30	20	20	50	20	7.0
Moderate EEG Abnormality:								
16	13 $\frac{1}{2}$	85	40	25	80	10	60	11.0
17	7 $\frac{1}{2}$	77	17	25	20	80	35	12.7
18	3 $\frac{1}{2}$	74	20	35	30	33	18	8.6
19	4	93	20	20	15	15	10	4.1
20	2 $\frac{1}{2}$	70	17	15	15	16	4	4.4
21	8	88	25	20	15	35	15	16.1
22	4	82	22	25	15	25	14	5.7
23	5 $\frac{1}{2}$	87	45	30	25	16	16	7.2
24	10 $\frac{1}{2}$	82	40	35	70	33	15	7.5
25	6 $\frac{1}{2}$	79	45	30	30	18	40	6.4
26	8	83	25	25	25	16	16	5.7
27	9	79	50	45	45	16	13	5.2
28	2	84	30	30	35	18	30	7.3
29	5 $\frac{1}{2}$	85	30	30	25	22	22	6.3
30	—1 $\frac{1}{2}$	82	25	25	45	16	46	8.9
31	9 $\frac{1}{2}$	88	40	40	40	65	50	10.7
Severe EEG Abnormality:								
32	2	78	20	20	40	20	50	11.4
33	—1	65	20	20	55	20	66	14.2
34	0	91	12	17	20	40	100	15.9
35	0	85	25	30	40	70	50	12.8
36	0	80	12	20	40	80	60	18.3
37	1	80	40	45	50	22	32	8.1
38	—1	75	15	35	50	90	35	17.8
39	—3	75	15	20	50	10	100	18.4
40	1	85	20	30	25	50	80	13.2
41	4	84	20	30	20	60	20	10.5
42	0	77	45	45	40	18	30	6.7
43	2	74	20	30	30	60	22	11.0
44	0	86	15	30	50	90	60	19.2
45	0	77	30	40	30	100	80	14.5
46	0	85	20	40	100	70	40	18.4
47	5 $\frac{1}{2}$	75	30	25	40	80	100	14.3
48	—2	72	30	30	40	80	100	14.8
49	—2	82	tr.	30	40	80	100	22.4
50	0	76	tr.	30	40	80	100	22.4

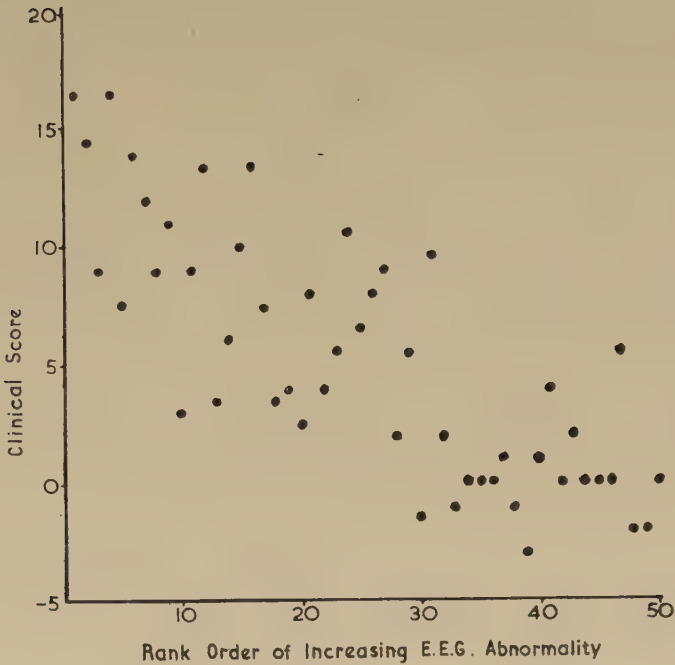


FIG. 1

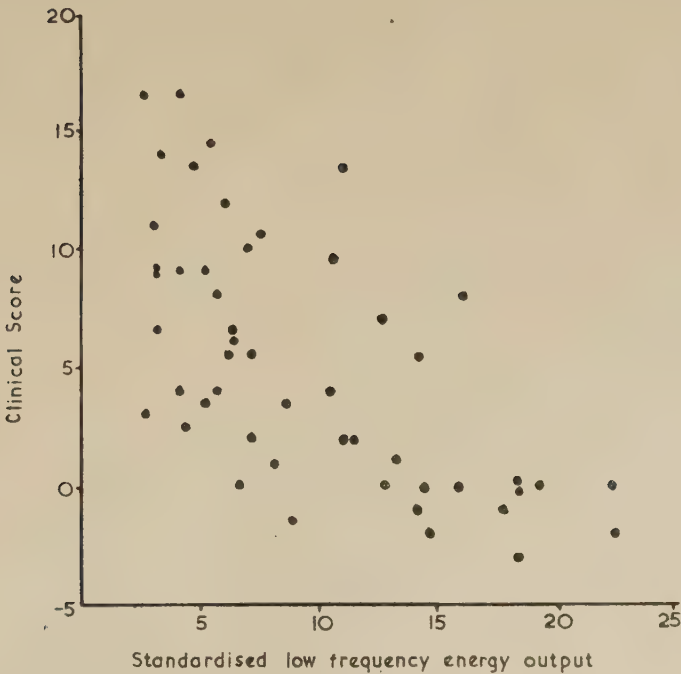


FIG. 2

In view of the fact that a greater number of variables was considered in the ranking by visual impression, the higher value for this correlation is not surprising.

DISCUSSION

In an earlier paper from this department (McAdam and McClatchey, 1952) there was reported a high incidence of abnormal low frequency activity in the EEG's of cases of senile and arteriosclerotic dementia but no correlation was observed between the amount of abnormality and the depth of intellectual deterioration. In papers published subsequently, observations have been made which suggest more or less strongly that there is such a correlation. Luce and Rothschild (1953) divided a large group of psychiatric patients over 65 into four categories according to the degree of disability, and found that the proportion of abnormal to normal records was higher, the more severe the disability. Mundy-Castle *et al.* (1954) confirmed that diffuse theta or theta and delta rhythms were characteristic of the senile psychoses; found little clear relationship between type of abnormality and degree of dementia; but noted like Luce and Rothschild that diffuse theta and delta rhythms were found most often in the most severe grade of dementia; Silverman *et al.* (1955) observed that elderly subjects who continued to work and appeared to have higher intellectual capacity and fewer signs of deterioration had EEG's which indicated that their brains were functioning in a manner more closely "physiologically resembling records of younger people".

McAdam and McClatchey, commenting on the lack of correlation between amount of abnormality and severity of dementia, suggested that poor case selection might have been a factor. In the study described in the present paper, very great importance was attached to achieving as nearly as possible a uniformity of type among our cases. In McAdam and McClatchey's series there were many cases of advanced chronic schizophrenia: in that of Mundy-Castle and his associates, more than half the cases were of other than simple senile deterioration and included presbyophrenic forms, presenile deterioration, delirious states, depressions, and others. Silverman and his colleagues included cases of "functional" psychiatric illness and neurological illness such as stroke and tumour. Luce and Rothschild included psychosis with organic disease of the nervous system, alcoholic, "functional" and other conditions. We do not consider therefore that the much less direct, and lower correlations found in the extensive surveys of these authors in any way invalidate our own findings.

We have not in this paper considered the significance of different types of abnormality, e.g. the significance of slowed alpha as compared with an intrusion of theta.

The method of assessing the degree of deterioration may be worthy of comment. Luce and Rothschild considered that stream of talk, lack of memory, and disorientation were the most consistent indicators of mental impairment. We were unable to devise any numerical rating on these points that could be duplicated consistently in order to be capable of being criticized statistically. And we were unable to use orthodox methods of assessing organic deterioration, as by comparing scores on eductive tests with vocabulary scales (Raven, 1947, 1948) mainly because our worst cases were beyond the reach of such testing; also because even the simpler tests in the Progressive Matrices, for example, often cause agitation which vitiates further study: and because there is serious doubt as to the validity of vocabulary assessments of pre-deterioration capacity (Orme, 1955). The scoring that was used in the present paper is substantially a

rationalization of a clinical impression, so defined and formulated as to be capable of being submitted to criticism. We believe that clinical experience formulated *ad hoc* for studies of this kind is capable of giving valid information which is beyond the reach of the precision tools of standardized academic psychological tests.

SUMMARY

Fifty cases of senile intellectual deterioration were studied.

Rating scales were devised for recording the amount of abnormality in the EEG and the degree of deterioration observed clinically.

A trend of conformity was demonstrated between the clinical and the EEG assessments.

ACKNOWLEDGMENTS

We are grateful to Dr. P. K. McCowan, Physician Superintendent, and to Dr. A. C. Tait, Director of Clinical Research, for criticism, comment, and facilitation of access to case material: to Miss B. Corrie, for scrupulous recording and clerking: and to Dr. R. Hetherington, Senior Clinical Psychologist, for the statistical work.

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INFLUENCES OF RESERPINE ON E.C.T.: PRELIMINARY OBSERVATIONS

By

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THERE have been some indications in recent literature (Naidoo, 1956) that reserpine influences the kind of fit that patients have with E.C.T. The first time this came to our notice was a few months ago when we noticed that a patient who was receiving 9 mg. of reserpine daily took an unduly long time to resume breathing after her fit. However, she also had Parkinsonism, and we were using succinyl choline and intravenous anaesthetic, so we thought that perhaps this was a Parkinsonian idiosyncratic response to reserpine and succinyl choline (Ferguson, 1956). Since then, in chronic psychotics who have been having quite large doses of the drug over a long period, we have been struck by the apparent delay in resuming respiration after E.C.T. given "straight", i.e. without relaxants. There have been alarming reports of collapse, even death in one instance from America (Foster and Gayle, 1955).

The purpose of the present investigation was therefore to measure some aspects of the convulsion in a group of patients who were receiving both reserpine and E.C.T., and to compare similar results in patients who were receiving maintenance E.C.T. alone. No attempt will be made to evaluate therapeutic differences here.

METHOD

An Ectron machine was used and current was passed for 1.5 seconds in each case. Time intervals were measured from the initial depression of the switch until respiration was clearly re-established, i.e. the third spontaneous inspiration. This was carried out in 13 cases receiving only E.C.T. and in 7 cases who had reserpine-E.C.T.

In a subgroup consisting of 8 non-reserpine cases and 4 reserpine cases, blood pressure and pulse rates were measured 15 minutes before the fit and 15 minutes afterwards.

The number of clonic spasms following the tonic phase was counted in another subgroup. The cases were all female, age range 21-56, and duration of stay in hospital varied from 1-18 years. The reserpine group had been receiving the drug for 8 weeks in a dosage of from 3-8 mg. daily.

RESULTS

(a) *Period of Apnoea*—see Table I.

TABLE I
Apnoea

Type	No. of Cases	Total Apnoea Time (seconds)	Average (seconds)	Range (seconds)
E.C.T. alone	13	628	48.3	36-73
E.C.T. $\bar{c}$ reserpine	7	366	52.3	43-60

(b) *Clonic Spasms*—see Table II.

TABLE II
Clonic Spasms

Type	No. of Cases	Total	Average	Range
E.C.T. alone	8	475	59.4	37-90
E.C.T. $\bar{c}$ reserpine	7	80	11.4	0-21

(c) *Blood Pressure*—Mean arterial blood pressure was the measure used (M.A.B.P. = Diastolic pressure plus one third pulse pressure)—see Table III.

TABLE III
Blood Pressure

	Non-Reserpine		Response	Reserpine		Response
	Before	After		Before	After	
M.A.B.P. mm. Hg	93	100	Up	70	90	Up
	85	83	Down			
	97	102	Up	82	87	Up
	123	102	Down			
	109	87	Down	90	97	Up
	93	92	Down			
	97	86	Down	88	92	Up
	102	90	Down			

It will be seen, therefore, that there is a clear tendency for the blood pressure to rise in reserpine-E.C.T. cases.

(d) *Pulse Rate*—These results show an increase in pulse rate in both groups, though the response is more clear-cut in the reserpine group (see Table IV).

TABLE IV
Pulse Rate

	Non-Reserpine E.C.T.		Response	Reserpine E.C.T.		Response
	Before	After		Before	After	
Pulse Rates	90	100	Increase	64	74	Increase
	90	98	Increase			
	84	98	Increase	56	80	Increase
	104	94	Decrease			
	84	86	Increase	60	72	Increase
	88	84	Decrease			
	112	116	Increase	64	76	Increase
	110	120	Increase			

DISCUSSION

Although the numbers involved are far too small for any reliable appraisal, it does seem likely that such differences as have been noted in the number of clonic spasms are going to be greater than can be accountable by chance. In

fact, on the first two occasions when E.C.T. was given, we assumed (erroneously, it now appears) that the responses were subconvulsive, and administered another shock. In the non-reserpine convulsion, the tonic stage passes into a stage of very fine tremor, and it is only when the tremor becomes coarse enough that the individual clonic spasms can be counted. Reserpine appears to abolish this stage of very fine tremor. The tonic phase occurs at once and quite violently, appears to last the usual length of time, and then abruptly ceases, to be followed by a few almost leisurely clonic spasms. In the 8 instances reported here, we counted 0, 19, 12, 6, 21, 3, 19 jerks. In the control group of 13 cases, the spasms ranged from 37-90. The effect of reserpine on neuromuscular tonus is well known, and coarse tremors are one of the commonest of its side effects (Vakil, 1949), going on to something approaching frank Parkinsonism in severe cases (Davies and Shepherd, 1955). There would be no point in speculating on the mechanisms involved in this short paper beyond perhaps saying that the explanation is likely to lie in the physiological action of reserpine on hypothalamic-extra pyramidal circuits.

As far as prolonged apnoea is concerned, this may be more apparent than real. We were surprised that the figure showed only a slight prolongation of the apnoeic interval in reserpine patients, for it appeared to be much longer when one was actually watching it. A possible explanation is this—that the fit itself was short lived in terms of muscular activity, but the apnoeic period lasted as long as or rather, on the average, longer than it does in ordinary cases. This discrepancy led to an intuitive but, as it turns out, faulty estimation. However, much larger numbers will need to be assessed before definite conclusions can be drawn. It may be, however, that there is a stage of reserpine treatment when it is unwise to use E.C.T. For example, the 6 cases of collapse, including the one fatality, quoted by Foster and Gayle (1956) had all been receiving the drug for only a few days. Now it is well known that, employing the dosage of 5-10 mg. per day which is now common psychiatric usage, the first week of the new regime finds the patient in a state akin to stupor, with vital functions considerably depressed. In addition, it has been our experience that the main disturbance in fluid balance occurs between the 10th and 20th day of treatment, whereupon it tends to remit rapidly and spontaneously. Foster and Gayle recommend that a week should elapse between stopping reserpine treatment and starting E.C.T. It is our impression that it may be equally safe to give E.C.T. to a patient who has been receiving reserpine for at least a month, i.e. when the physiological mechanisms have reached a plateau of adjustment.

Another feature noted in passing, the significance of which is not clear, is the wide opening of the eyes accompanied by upward rotation of the eyeballs which occurred from 25-30 seconds after the onset of the convulsion in the drug cases. This response was only seen in a small proportion of the cases treated by E.C.T. alone, those in which the fit was violent and prolonged. Additionally noted with the reserpine is the extent to which oral and pulmonary secretions are increased. This has not so far proved troublesome, and is only to be expected since hypersalivation and drooling are well known side effects of the drug.

SUMMARY

A short series of cases is reported comparing the effect of E.C.T. in patients receiving reserpine treatment with a control group.

The effects of the drug are as follows:

- (1) The post-ictal apnoeic interval is prolonged.
- (2) The muscular discharge is reduced and qualitatively altered.

Results of blood pressure and pulse rate changes in the two groups are given, but the numbers are too small for any useful conclusions to be drawn.

Certain precautionary measures concerning combined reserpine-E.C.T. treatment are discussed.

ACKNOWLEDGMENTS

I am indebted to Dr. J. P. Child, Physician Superintendent, for permission to carry out these investigations, and to my colleague Dr. T. A. Muckle, and the nursing staff of St. Nicholas' Hospital for their help in this work, also to Dr. R. K. Pittman of Ciba Laboratories for his interest and help.

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TOXIC PSYCHOSIS UNDER CORTISONE AND CORTICOTROPHIN

By

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It is generally conceded that the majority of effectual therapeutic remedies carry potential hazards, some of them incalculable.

In the case of Cortisone or Corticotrophin (A.C.T.H.), the passage of time since these were first employed in 1950 has permitted an appraisal of their associated risks.

The object of this paper is to stress the undesirable mental reactions from these hormones, now in wider use, and to illustrate the pattern of such complications from three case-histories in my personal experience.

THE RISKS

The major risks are of two main orders, namely, the suicidal depressives (Pearson and Eliel, 1950; Borman *et al.*, 1951; Galdston *et al.*, 1951; Kirsner and Palmer, 1954), and those seriously disturbed who have been submitted to prefrontal leucotomy (Hellier, 1954), due in one recorded instance to hypomania (MRC Panel, 1954).

Between these two extremes any degree of mental reaction may occur.

INCIDENCE

Changes in mood are more commonly noted than major mental disturbances, as is evident by reference to Table I.

The amelioration of physical symptoms with resultant euphoria or mood-enhancement provides a psychological reaction in keeping with the natural response to treatment, and offering comparison with varying grades of depression when the patient's expectations from the "wonder drug" are tardily rewarded.

The incidence of psychotic reactions is admittedly low, namely 4 per cent. (Table I), but Ragan (1953) quotes an overall figure of 36 per cent. for mental symptoms, noting that in his series these reactions were all reversible although the severer grades required electroplexy for their termination.

PREDISPOSITION

This term implies an innate constitutional susceptibility distinct from predisposing factors, which may be classified as endogenous (age and sex) or exogenous (drug-dosage, treatment-duration and physical disease).

Constitutional susceptibility is inferred from the pre-morbid personality or previous history of mental breakdown or similar family-history, but Professor Aubrey Lewis and Fleming (1954) have shown that even a positive past-history of psychotic breakdown does not confer any special vulnerability to Cortisone.

Ward *et al.* (1951) reported a higher incidence of mental reactions in women particularly in the menopausal age-group, but in their series of five women aged between forty-six and sixty-nine with rheumatoid arthritis treated from twelve

TABLE 1
Summary of Published Series with Mental Reactions Under Cortisone or Corticotrophin

Author	Year	Drug	Total No. of Cases	Disease Indications	Duration of Treatment	Affective-State			Psy-chosis	Outcome
						Eu-phoria	Hypo-mania	Depres-sion		
1 Boland, E. W.	1951	C	76	Rheumatoid Arthritis	6-15 months	2(*)				
2 Ward, E., et al.	1951	C	100	Rheumatoid Arthritis	Long-term	29(*)			2	
3 Lidz, T., et al.	1952	A & C	15	Various but in 10 cases Asthma	8-38 days	4				
4 Glaser, G. H.	1953	A & C	200	Various	13-155 days			1	10(t)	E.C.T. in 5
5 Levin, M. H., et al.	1953	A & C	50	Arthritis	18 months				5(z)	
6 Taran, L. M., et al.	1953	A & C	16	Rheumatoid Carditis	Long-term	6(y)		3		
7 Copeman, W. S., et al.	1954	C	20	Rheumatoid Arthritis	Long-term			1		
8 Engleman, E., et al.	1954	C	56	Rheumatoid Arthritis	4-38 months	9(x)				
9 Kirsner, J., et al.	1954	A	120	Ulcerated Colitis	1-4 years	23		13	8	Suicides in 2
10 McGehee, E. H., et al.	1954	A & C	185	Various	Long-term				3	
11 MRC Panel	1954	A & C	124	Skin Disorders	Short-term	2	1	1	2?	Leucotomy in 1
12 Trethowan, W.	1954	A & C	17	Rheumatoid Arthritis	?				3	
13 Bunim, J. J., et al.	1955	A & C	78	Rheumatoid Arthritis	Up to 4 years			4		
14 Fox, H. M., et al.	1955	A & C	100	Various	? months				16	
15 Pearson, J. E. G.	1955	A	10	Asthma	Short-term	1				
16 Toone, E. C., et al.	1955	C	35	Rheumatoid Arthritis	Up to 3 years		1	1	1	

(*) Described as "mental stimulation" and "nervousness".

(x) Described as "emotional instability".

(t) Includes 2 "manic", 1 manic-depressive, 4 organic (paranoid-depressive), 2 organic (paranoid), and 1 organic (depressive).

(y) Associated with other complications, e.g. Cushing's Syndrome.

(z) Includes 3 manic-depressives and 2 paranoid-schizophrenic reaction-types.

A Refers to A.C.T.H.

C Refers to Cortisone.

to twenty-four months with Corticotrophin (A.C.T.H.) at Sheffield, West and Newns (1955) encountered no mental reactions.

The role of pre-morbid personality-structure has received considerable emphasis by some authors. For example, Copeman (1954) refers to psychosis as the most serious complication of hormone treatment and regards present or past psychosis an absolute contra-indication to such treatment.

Dunlop (1955) finds that Cortisone exaggerates neurotic, psychotic or epileptic tendencies, and should be employed only for very compelling reasons in those with an unstable mental background. Professor Wayne (1955) of Glasgow prefers not to treat a patient with a history of mental disturbance, but adds that it is by no means certain that any ill would result.

On the other hand, none of the ten cases with minor or major mental reactions listed by Clark *et al.* (1952) gave a history of previous mental breakdown, from which these authors conclude that the basis of individual susceptibility to these hormones remains an unknown quantity.

Glaser (1953) is of the opinion that the pre-morbid personality determines the psychological content of the psychosis but not its onset.

Aubrey Lewis and Fleminger (1954) point out that the unknown factor predisposing to a mental reaction under Cortisone can hardly be derived from the corresponding hereditary or environmental constellation endowing such cases with an antecedent mental breakdown unrelated to Cortisone therapy; also, that a predisposition to the occurrence of mental illness is distinct from the form such illness may take.

With regard to dosage and duration of treatment, it is known that the risks of mental reactions are in direct ratio to high dosage or prolonged courses of treatment; similarly, too rapid reduction of hormone towards the conclusion of a course may lead to "withdrawal symptoms" with conspicuous depression. Nevertheless, Clark (1952) and Glaser (1953) could find no consistent correlation between drug-dosage and the onset, duration or type of psychotic reaction.

From various trials the tentative impression emerges that the collagen diseases (Wayne, 1955) and Addison's disease of the adrenal glands render their subjects more vulnerable to mental disturbances than other physical diseases, although in the main the complications of Cortisone or Corticotrophin are similar for the great majority of conditions for which these hormones are utilized (Duthie, 1955).

The influence of the various determinants is reflected in Table II.

THE CLINICAL PICTURE

(a) *Mode of Onset*

The major psychotic disturbances are heralded by premonitory subjective and objective deviations of mood with accompanying vague somatic symptoms before behaviour or thought-processes become manifestly disturbed. The type of mood-change depends upon the basic personality-structure of the individual as outlined on the following schema:

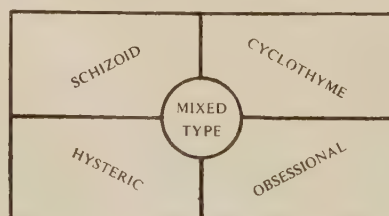


TABLE II
Analysis of a Quantum with Mental Reactions

	Author	Year	Drug	Dose Daily Average	Total Dosage Estimate	Duration of Treatment	Disease Indications	Premorbid Personality	No. with Mental Symptoms	Age Average	Sex	Onset of Mental Symptoms “Early days” of drug	Duration of Mental Symptoms ?	Any Other Associated Findings
1	Boland, E. W.	1951	C	200 mg. 2 days then 100 mg.	900 mg. to 3,800 mg.	7–36 days	Rheumatoid Arthritis	“Unstable”	2	Menopausal	F	“Early days” of drug	?	No
2	Ward, E., <i>et al.</i>	1951	C	100 mg.	Variable	1–12 months	Rheumatoid Arthritis	?	29	Menopausal more prone	F & M	?	?	Yes; not specified
3	Clark, L. D., <i>et al.</i>	1952	A	55.6 mg.	6,615 mg.	119 days	Rheumatoid Arthritis and Duodenal Ulcers	Unstable	1	27	M	56th day	? days	No
4	Clark, L. D., <i>et al.</i>	1952	A	100 mg.	12,898 mg.	114 days	Rheumatoid Arthritis and Exfoliative Dermatitis	Stable	1	31	F	116th day	3 days	No
5	Clark, L. D., <i>et al.</i>	1952	A	100 mg.	800 mg.	8 days	Reiter’s Disease	Stable	1	24	M	4th day	6 days	No
6	Clark, L. D., <i>et al.</i>	1952	A	140 mg. to 200 mg.	2,875 mg.	20 days	Reiter’s Disease	Introspective	1	24	M	15th day	10 days	No
7	Clark, L. D., <i>et al.</i>	1952	A	85 mg. 25 mg.	1,275 mg. 525 mg.	15 days 21 days	Disseminated Lupus Erythematosus	Immature	1*	23	F	12th day 22nd day	6 days 9 days	Grand Mal and C.N.S. signs Operation on knee Iritis
8	Clark, L. D. <i>et al.</i> ,	1952	A	60 mg.	2,340 mg.	39 days	Rheumatoid Arthritis	Cyclothyme	1*	21	F	39th day	6 days	
9	Clark, L. D. <i>et al.</i> ,	1952	A	40 mg. to 80 mg.	4,600 mg.	77 days	Rheumatoid Arthritis	?	1*	56	F	56th day	18 days	
10	Clark, L. D., <i>et al.</i>	1952	C	200 mg.	2,775 mg.	13 days	Rheumatoid Arthritis	Egocentric	1*	62	F	13th day	32 days	No
11	Clark, L. D., <i>et al.</i>	1952	C	230 mg.	3,220 mg.	14 days	Rheumatoid Arthritis Spondylitis	Introvert; Family History of Suicide	1*	49	M	15th day	156 days	No
12	Clark, L. D., <i>et al.</i>	1952	A	75 mg. to 25 mg.	13,220 mg.	122 days	Rheumatoid Arthritis	?	1*	20	F	120th day	31 days	No
13	Lidz, T., <i>et al.</i>	1952	C	165 mg.	2,650 mg.	16 days	Disseminated Lupus Erythematosus	?	1*	20	F	8th day	?	Neurological signs
14	Lidz, T., <i>et al.</i>	1952	A	78 mg.	2,969 mg.	38 days	Periarteritis Nodosa	?	1*	57	M	?	?	“Brain damage” Yes; unspecified
15	Levin, M. H., <i>et al.</i>	1953	A & C	100 mg. to 300 mg.	Not assessable	12 days to 18 months	Rheumatoid Arthritis	Unstable	5*	?	?	In two in 10 days; and > 3 months in three	Ceased shortly after drugs omitted	
16	Cleghorn, R., <i>et al.</i>	1954	C	80 mg.	250 mg.	3 days	Addison’s and Diabetes Mellitus	Neurotic	1*	38	M	3rd day	2 days	No
17	Cleghorn, R., <i>et al.</i>	1954	C	50 mg.	800 mg.	3 days	Addison’s	Anxious; paranoid trends	1*	29	F	3rd day	7 days	No
18	Cleghorn, R., <i>et al.</i>	1954	C	200 mg.	912 mg.	3 days	Addison’s	Stable	1*	32	F	?	31 days	No
19	Engleman, E., <i>et al.</i>	1954	C	<75 mg.	Not assessable	4 to 38 months	Rheumatoid Arthritis	Neurotic in three	9	?	?	?	?	No
20	Toone, E. C., <i>et al.</i>	1955	C	100 mg. to 150 mg.	Not assessable	To 3 years	Rheumatoid Arthritis	?	3	?	2F 1M	Within 12 months	?	Scleroderma in one

A Refers to A.C.T.H.
C Refers to Cortisone.
* Denotes major mental disturbances, namely Psychoses.

In mixed types of personality, for example one occupying the central circle rather than an independent square, the mood-change would be modified. Somatic symptoms are more frequent in the hysteric, are referable to any system but may occur more frequently as indescribable "painless" headaches, vague shifting paraesthesiae and undue transient visceral awareness without localization.

(b) *Course*

Of the psychotic-like reactions, Glaser (1953) notes two major patterns, namely (i) primarily affective disorder either manic or depressive, and more frequently (ii) an organic reaction (toxic psychosis) with associated paranoid-hallucinatory and/or affective (usually depressive) components. Fox *et al.* (1955) describe the mental reactions as the result of the inter-play of the following three factors on the patient's personality, namely (i) the pharmacological effect of Cortisone or Corticotrophin on the total personality; (ii) the meaning to the patient of the alteration in the symptoms of his disease; (iii) the nature of the patient's fantasies about the action of the administered substance ("wonder drug"). These authors found disturbances of mood, of thinking and of the perception of reality with minimal or no clouding of consciousness, no dis-orientation nor intellectual deficit.

Clark, Bauer and Cobb (1952) were impressed by the invariability of disturbances of speech and affective disorder, while delusions, disturbances of body-image, motor disturbances and depersonalization were inconstant features in their series of psychotic reactions. These authors noted that the psychotic features due to Cortisone presented a fragmentary structureless picture in unpredictable sequence without the disorientation and sensorial disturbance characteristic of a toxi-delirious state.

Professor Anderson of Manchester University (1955) remarks that the protean character of the symptomatology of psychosis following Cortisone has been a feature of the condition, and describes the occurrence of both depressive and manic phases in one case with paranoid trends in a setting of mild clouding of consciousness—a combination of syndromes somewhat distinctive.

(c) *Outcome*

Exceptionally, they may respond dramatically, but by and large the cortisone-precipitated psychotic reactions revert progressively (*vide* Table II for duration of the mental symptoms) once the offending hormone is discontinued or the dose drastically reduced, but recovery is not invariable and the risk of suicide very real.

In so far as rheumatoid arthritis, ulcerative colitis, asthma and certain skin disorders often are psychogenically determined, the effect of the patient's attitude to his physical disease is no less important than the influence of a potent hormone on his basic personality-structure.

CASE HISTORIES

Case 1

J.F., male, aet. 64, of pyknic build, with a history of ulcerative colitis for thirty-three years dating from 1919 following various traumatic incidents in the Great War including "gassing" for which he drew a disability pension. He had suffered innumerable exacerbations of his symptoms having a temporal relationship to changes in residence, in his occupations, and the vicissitudes of family affairs until admitted for treatment with Cortisone at a dosage of 100 mg. daily. A course lasting six weeks was completed uneventfully, but the effect was short-lived and some two months later he was readmitted for a second course.

During the first week, it was obvious he was extremely low-spirited, he did not smile, nothing interested him; he was attuned to a morbid introspective hypochondriacal pre-occupation that even the "wonder drug" could not cure him—all these features occurred in a markedly depressive setting without clouding of consciousness.

For the next five days his prevailing mood of apathetic depression fluctuated little if at all; he was harassed by insomnia, anorexia and diarrhoea, and reiterated the wish to be "back at the front in the War". He maintained a hostile, resentful attitude towards the staff, regarding food and medicines alike with disdain if not actual refusal.

In the course of a week, Cortisone resulted in a reduction of the bowel-frequency and the disappearance of sanguineous motions; the patient was aware of this, which coincided with a dramatic lifting of his depression, which had lasted in all about ten days.

Unfortunately, his subsequent course was marred by the development of jaundice and enlargement of the liver, which was firm, nodular and tender; he failed to recover, and autopsy disclosed metastases in the liver and polyposis of the colon with histologically demonstrable malignant change. This case has been reported elsewhere (Truelove and Witts, 1955). Intracranial metastases were unidentified histologically.

Case 2

M.S., married woman, aet. 28, leptosomatic in build, below average intelligence and of insecure dependent personality, had been subject to "fits" in infancy, but her adolescence was uneventful until the age of eighteen when three consecutive emotionally-laden events in her life ushered in bouts of diarrhoea, which four years later was diagnosed as ulcerative colitis: firstly, the sudden demise of her maternal grandmother ("clot in the brain") who had brought her up and whom she regarded as her mother; also the sudden loss of her father—both events witnessed by the patient with profound grief-reaction; finally, her rejection by her lover "after the banns had been called".

A year later she met her present husband, but even then she used to spend hours daily at the Cemetery. Her marriage in 1952 to an erratic, vagrant individual was not a happy choice for economic reasons, as jobless periods provoked symptomatic exacerbations of her diarrhoea as much as a miscarriage did in 1953, and the husband's eventual engagement in the Regular Army as an insurance against unemployment was a mixed blessing, for postings abroad extended her illness.

No permanent benefit having accrued from usual methods of treatment, she was given (i) A.C.T.H. 30 units twice daily from 7 till the 12 December; and (ii) Cortisone 50 mg. twice daily from 13 to 20 December, 1954.

On 28th she was a trifle elated and showed a degree of impairment of self-identification in that she referred to herself as "Doris" (not in fact one of her eight first names!), and left her relatives with the impression of being "odd" by calling one of her aunts "Bovril" (worked at this factory) and another aunt "Red Jumper".

The next day she was tearful, perplexed and evinced a greater degree of affective response than the circumstances warranted; for example, when asked why she was crying, she replied that she had not received a christmas card from her husband in Korea.

On the 31 December her mood, thought-processes, and behaviour became bizarre: she shouted out the names of her physicians at intervals, evidently in response to hallucinations; she approached her relatives with a Bible in her hand, demanding "my mother is dead—isn't she?"; she insisted that the electric light in her bedroom must remain switched on even in daylight, rationalizing that she was afraid of the dark.

On 1 January, 1955, she was tending to lose reality-contact with her surroundings, and now frankly accused her physicians of murdering her. The next day she became hypomanic and required sedation before admission to hospital effected on the following day, when she appeared dazed, was apprehensive of the dark, and was hallucinating manifestly both auditorily and visually, in response to which she would posture with clasped hands gazing towards a corner of the ceiling in an attitude of meditation, regardless of questions put to her. She whispered rather than spoke: she did not know whether she were in a hotel, school or hospital; she asked to see a former physician by name but could not define her reasons; she could not recall the names of the staff she saw daily; these features were present in a setting of mild clouding of consciousness, continuing for the next eight days. Physically, she was anaemic, undernourished and showed glossitis.

In view of her refusal to take nourishment, electroplexy was given on two consecutive days followed by feeding, after which her negativistic attitude commenced to change.

On 10 January, her sensorium had not yet cleared: she asked if she might "spit on the spittoon 'cos I can't spit on my tongue". Four days later, she smiled for the first time and appeared to appreciate the point of remarks made to her. On 20 January, she recognized us by name, and endeavoured to engage in occupational therapy, but was somewhat solitary in her habits and fond of day-dreaming. Her physical symptoms fluctuated but there was a sustained response to anti-anaemic measures.

In the interim, her husband had been recalled from Korea, but this step did not result in any dramatic improvement; as late as 4 February, during the visit of the Mass Miniature Radiography Unit she expressed the fear that "she was to be put on the trolley to be taken to the fire". At the time she could not account for these thoughts, but a week later confessed that "they were silly".

From this stage she made an uninterrupted recovery as regards her psychosis, but her mood was one of resignation to her physical illness without undue embarrassment, and she was discharged from hospital on 5 April, 1955—the total period of her mental illness lasting forty-two days.

Case 3

L.P., widow, leptosomatic in build, aet. 49, of stable personality, whose climacteric was sudden in onset three years previously following the demise of her invalid husband with rectal neoplasm in the course of a month. One of the patient's brothers had spent an indefinite period at a mental hospital. For twenty months, she had been under treatment for rheumatoid arthritis and finally was given a trial of A.C.T.H. from 22 to 28 October at 25 units six-hourly; and from 29 October to 1 November 25 units twice daily, when the course was suspended (11 days in all) in view of her mental symptoms.

On 28 October, vague band-like pains in the head oppressed the patient, followed by paraesthesiae in the digits the next day; on 30th, she was elated in mood, showed inconsistent levity at Divine Service during which she alleged the hospital ward was transformed into a beautiful cathedral with timbered naves, where the congregation consisted of the patients in white "like angels"; as she left the ward, she asserted she was informed by other patients that "the wrong man took the Service"—implying that it should have been the Bishop instead of the usual minister to the Hospital.

On 31 October, when beds were being prepared in the evening by the nurses, she felt that "they were getting at me with white sheets as if I were to be put in a coffin". That night she believed she were back in her 'teens and in a palace, and told the nurse "I have seen God and He has convinced me I can do all this . . .". On the morning of 1 November, there was mild clouding of consciousness which appeared to clear that evening when she tried to recall unsuccessfully the happenings of the day and the names of the visiting doctors whom she saw daily. During the night she was hallucinated cutaneously, protesting that her pyjamas were soaking wet, but the lability of her mood was evident by her ready acceptance of the nurse's reassurance, without affective discharge.

On 2 November, she was compulsively motivated to stoking the fire and pulling the toilet-chain, regarding these activities as devices whereby "I can make myself clean"; in mood she was mildly agitated. On 3 November, she was elated and remarked she was on the stage with her entire family including her parents (both in fact deceased), and they exchanged greetings with her. She continued "I was happy, and I got up and sang for them:

'Around the throne of Heaven a lot of children stand,
Children whose sins are forgiven in a happy land'";

during this interlude she alleged the "sun shone only to my right", but she could not elaborate on the meaning or physical aspects of this phenomenon. The next day she was hallucinating visually, describing herself as being influenced by a beam of light which coursed round the room trying to find somebody till it picked on her; momentarily, she was "like Christ". She continued "then wonderful colours of a queen came over me which I did not want, but I was surrounded by bishops and surgeons".

On 5 November at night, she experienced the sensation of gentle levitation of the entire bed "as if carried on air"—which she ascribed to the effects of a supernatural Power endeavouring to use her as an "agent to prosper the world and people in it". The next day she was hallucinating visually, with posturing; when questioned, she replied she was conversing with God Whom she could see.

Three days later, she appeared to have regained reality-contact with her environment and to have insight. Her physical symptoms had been relieved, and the total period of her mental symptoms was ten days.

COMMENT

The three cases herein recorded present such different pictures that to find unity among diversity appears at first sight unlikely.

Cases 1 and 2 have in common their physical condition, their stable family-histories, sustained exposure to a variety of stressful situations, and their similar personality pattern; they differ in the temporal sequence of their mental reactions to hormonal treatment and in the pattern and duration of this reaction. Continuation of treatment in Case 1 met with as good a response as Cleghorn and Pattee's (1954) second case in whom the dose was actually increased despite mental symptoms.

Cases 2 and 3 resemble each other in their alternating depressive and hypomanic features, with paranoid trends colouring the picture at a depressive end of the scale; and in their mild clouding of consciousness during the early

stages of treatment. They differ in age, physical disease and in duration of the psychotic reaction.

It would appear to be a fair commentary that psychosis can be precipitated by Cortisone or by A.C.T.H., but is neither predictable nor reversible in any given case. In some, suicide has eventuated, in others psycho-surgical measures, i.e. leucotomy, have been employed. Certain diseases such as Addison's and the collagen diseases render their subjects unduly susceptible to side-reactions of a psychiatric nature, in particular if these are women of menopausal age, who form the large bulk of those under treatment for rheumatoid arthritis and may constitute one group of cases of ulcerative colitis of late onset (Banks and Klayman, 1953).

Premonitory symptoms of mood-change in either polar direction of depression or elation signify more serious disorder and should be anticipated at any stage of treatment with the hormones; if present, continuation of treatment requires a nice judgment balanced against a background of possible psychiatric illness whose outcome may be the major and avoidable hazard.

Hoefer and Glaser (1950) consider that the mental changes represent the release of a psychotic reaction through the exaggeration of pre-morbid personality trends or the occurrence of an organic mental reaction—or the interplay of both factors.

Rome and Braceland (1952) suggest that the sudden and profound variation in the "milieu intérieur" by the hormone disrupts the patient's psychological adaptation consisting of the organization of his personality, the psychological meaning of the disease to him, the emotional investment in his physical person and the significance of the secondary gains.

It may be that Fox, Gifford and Murawski (1955) are nearer the truth when they point out that on theoretical grounds, every individual may be capable of reaching a threshold of tolerance to Cortisone or A.C.T.H. under a given dose for a certain period—beyond which metabolic or psychological equilibrium becomes so strained as to impair the individual's capacity for physiological homeostasis on the one hand and for the maintenance of emotional balance on the other.

In accordance with this view, the administration of these hormones constitutes an additional non-specific stress to which the organism is unable to adjust because its "psychological emergency reserve" has been exhausted through existing physical disease and its emotional accompaniments.

As a footnote it may be added that A.C.T.H. and Cortisone have been used experimentally in two series of cases by Glaser and Hoch (1951) and by Rees and King (1952) in the treatment of schizophrenia; in the first group of six cases, a woman of twenty-three displayed striking psychic changes resembling the type of psychotic reaction induced by A.C.T.H., while in the second series temporary exacerbation under Cortisone was corrected by cessation of the drug.

SUMMARY

1. Psychotic reactions may be induced by Cortisone or by A.C.T.H., in the course of which suicidal depression or serious mental disturbance requiring leucotomy may add to the known physical risks of treatment with these hormones.

2. No constant feature of premorbid personality has been determined that may guide clinically in the anticipation of the more serious grades of mental reaction.

3. Women of menopausal age appear to be more susceptible to these reactions.

4. There is no correlation between electrolyte imbalance and the development of mental reactions.

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SOME SIMPLE MEASURES OF SCHIZOPHRENIC DETERIORATION

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I. INTRODUCTION

"DEMENTIA PRAECOX" was discarded when it became apparent that a true dementing process was not present in schizophrenia. Most writers agree with the view put forward by French authors that the deterioration in schizophrenia is not the same as that seen in the organic psychoses (Lehrmann, 1940). Experimental work has indicated that intellectual deterioration in schizophrenia is more apparent than real, and that as it appears most when sustained effort and co-operation are required, any changes in co-operativeness and ability to maintain sustained effort invariably affect intelligence test scores (Kendig and Richmond, 1940; Sheldon Rappaport, 1951). The concept of schizophrenic deterioration employed in this article refers to a deterioration of behaviour in general, and to a deterioration of a patient's ability to look after himself in particular. With increasing interest in methods of treating deteriorated schizophrenic patients, we need reliable measures of deterioration in order to compare the effects of treatment in different groups. At present discrepancies in results are frequently due to some groups of schizophrenics being more deteriorated than others. For example Layman (1940) demonstrated that sodium amytal speeded up the psychomotor performances of schizophrenic patients, but subsequent work by Ogilvie (1953) did not confirm this finding. This discrepancy may have been due to the fact that Layman's schizophrenic group contained patients who were more deteriorated than the patients in Ogilvie's study. If a scale indicating the degree of schizophrenic deterioration could be devised, future researches into the treatment of deterioration in schizophrenia would benefit. There are a number of rating scales already available of which the best is probably the Fergus-Falls (Lucero *et al.*, 1951). All of these scales have several common defects. They contain a number of items which are very subjective in nature and dependent more on the rater than the patient. Many are also of such length that they are too time-consuming to complete, particularly in the case of patients on long-stay wards where the nursing staff are invariably overworked already.

II. METHOD

The problem of measuring schizophrenic deterioration has been approached in two ways, firstly by means of a standard interview, and secondly by means of a rating scale. These will be dealt with separately.

(i) *The Standard Interview*

The Ward Sister is instructed to bring a patient to the ward office and send her into the room saying "Go and talk to doctor". The doctor sits behind a desk with a vacant chair on the other side. The doctor says "Hallo", and waits for the response, then says "Please sit down", and indicates the chair. He then says in turn, "Please tell me your full name". "How long have you been here in hospital?" "Is there anything you particularly like to eat?" and then "Is there anything you wish to ask me?" He then offers the patient a peppermint from a 2d. roll, and accidentally knocks a book, previously positioned on the desk, to the floor. Lastly he says "You may go now". The response to these stimuli are scored either "passed" or "failed". A tenth item called "irrelevancies" scores where the patient adds irrelevant remarks, mutterings, or gestures, during the interview. Thus we have a test which can be shown as follows:

	<i>Pass</i>	<i>Failure</i>
1. Hallo.	Answers relevantly.	No answer or irrelevant reply.
2. Please sit down.	Sits.	Refuses to sit, or sits on floor.
3. What is your full name?	Name.	Irrelevant answer.
4. How long have you been here in hospital?	Gives number of years.	Inaccurate or irrelevant.
5. Is there anything you like to eat?	Gives a food.	Irrelevant or non-foodstuffs.
6. Is there anything you wish to ask me?	Relevant question.	No reply, or "don't know", or irrelevant.
7. Please take one peppermint.	Takes and eats one.	Does not take or does not eat.
8. Book falls.	Picks up.	Does not pick up.
9. You can go now.	Goes.	Stays.
10. Irrelevancies.		Mutters when not spoken to, or gets up and walks about, i.e. responses not relevant to situation or stimulus.

From the psychiatric point of view a schizophrenic patient who fails every item in this interview can be said to be more deteriorated than a patient passing every item, and hence the scoring system is a simple count of the number of items failed. Scores will thus range from 0-10. This is a relatively crude measure and it can be refined by scoring for partial failure or complete failure, thus, when the patient is asked for her full name she will be scored as partial failure if she gives only her christian or surname and full failure if her reply is nonsensical. Full records of all the patient's remarks have been kept in some of our tests and it is remarkable that many deteriorated patients' interviews will be identical word for word and gesture for gesture on re-test several months later.

(ii) *The Behaviour Rating Scale*

This rating scale has its origins in a research already reported (Baker and Thorpe, 1956), the present version containing the best features of the old.

Ten items of behaviour (Figures 1 and 2) were selected on the basis of their

FIGURE 1

A.	Awake and noisy all night.	Noisy at intervals at night.	Restless several times.	Restless or awake once.
B.	Motionless.	Occasional movement.	Very retarded.	Slightly retarded.
C.	Wildly excited—needs isolation all day.	Needed isolation for a short period.	Restless all day.	Restless for a short period.
D.	Tube fed.	Spoon fed.	Eats only with persuasion.	Finicky with food.
E.	Mute.	Occasional word with persuasion.	Speaks only if spoken to.	Occasional spontaneous remark.
F.	Needs dressing fully.	Needs help in dressing.	Dresses self but needs adjustment.	Dresses self but untidy.
G.	Does no work.	Works with supervision in ward.	Works with supervision outside ward.	Works without supervision.
H.	Doubly incontinent several times.	Doubly incontinent once.	Incontinent of urine several times.	Incontinent of urine once.
I.	Aggressive several times without provocation.	Aggressive once without provocation.	Aggressive several times when approached.	Aggressive once when approached.
J.	Has no friends.	Friendly towards one of staff.	Friendly towards one patient.	Friendly towards two people.

apparent relation to schizophrenic deterioration, and patients rated 0-4 on each item, a score of 0 representing behaviour which requires no nursing supervision. This scale has been chosen deliberately to provide a few items each of which is immediately relevant to the amount of care the patient needs from the nursing staff. This could be described as the amount he has regressed. We have chosen items about which the nurses will have acquired information in the ordinary course of their duties and will not require special observation to obtain. The grades of severity for each item have been chosen for the accuracy with which they can be noted by the nursing staff rather than because each is an equal sub-division. The intention was to provide a scale which could be completed very quickly and accurately as this means that nursing staff can record patients' behaviour daily without feeling they are neglecting other duties on a busy ward.

Again, from the psychiatric point of view, a schizophrenic patient rated 4 on each of the ten items can be said to be more deteriorated than a patient rated 0 on each item. The rating scale score is thus the sum of the ten ratings, and scores can vary from 0-40.

III. STATISTICAL CONSIDERATIONS

We need to know the reliability and validity of both the standard interview and the rating scale. That is we need to know whether a patient's behaviour is going to be the same from day to day, and whether it matters who carries out the interview or who does the ratings. Unless a patient's behaviour is

FIGURE 2
RATING SCALE
INSTRUCTIONS

The patient's full name and number should be entered at the top of each sheet, together with the dates for which it is being completed, whether this is to be for one day, only, or for a period of a week.

The sheet should be completed by filling in the appropriate column, i.e.:

<i>Tube fed</i>	<i>Spoon fed</i>	<i>Eats with persuasion</i>	<i>Finicky</i>	<i>Normal</i>
	Monday			
		Tuesday		
		Wednesday		
	Friday		Thursday	

means that the patient needed spoon feeding on Monday and Friday, ate with persuasion on Tuesday and Wednesday and normally on Thursday. In general the lowest level of behaviour would be the one recorded.

Further Explanations

- A. The Night Nurse should be asked to complete this and in the left hand margin a note should be made of any sedation the patient had at night.
- B. *Motionless* means that patient only goes to meals if taken and otherwise stands or sits in one place all day.
Occasional Movement means that patient only goes to meals if reminded and although staying in same place, does move limbs or head occasionally.
Very Retarded means that patient occasionally moves from one place to another, but slowly and cannot be hurried.
Slightly Retarded means that patient's movements are much slower than those of normal people, but she can be hurried on occasions.
- C. The amounts of sedation given on any day should be recorded in the left hand margin.
- D. *Finicky with Food* means that an occasional meal may be rejected or that some items are usually left on the side of the plate.
- E. and F. are self-explanatory.
- G. (1) *Works with Supervision in Ward* means that patient has to be supervised constantly or ceases to work.
 (2) *Works with Supervision Outside Ward* means that patient can be trusted to go to work on another ward or in the corridors, laundry, etc. A good worker in the ward who does *not* need supervision would come under the same rating.
 (3) *Works without Supervision* means that the patient can be sent to do a job and will complete it, but the standard of work would not be good enough for a patient living outside hospital. If any patient works well enough so that the standard would be sufficient for them to be self-supporting outside hospital, no rating would be given under G. as this is a normal level.
- H. Self-explanatory, but should be rated for 24 hours. The Night Nurse should complete it in red ink and the Day Staff in blue ink so that incontinence during the night appears as a red record and day-time incontinence in blue.
- I. (1) *Aggressive* means either physical attack, verbal abuse, or threats whether the attack is successful or not.
 (2) *Aggressive when Approached* means that patient is being addressed, or being taken to toilet, fed, dressed, or otherwise in contact with someone else.
- J. *Friendly* means that the patient shows some evidence of a friendly approach to the person concerned and not merely that they tolerate the approach of the other person.
 In the case of mute patients, friendly gestures still show evidence of the intention.

reasonably constant no matter who carries out the interview or the ratings, and unless different hospital staff give the same scores in both the interview and in the ratings to any one patient, then the two measures will have little practical value.

Secondly, even if the behaviour of patients is reasonably constant from day to day, and even if different members of the hospital staff can agree on the interview and the rating scale results, we still need to know whether the scores have any validity. That is, do they in fact measure deterioration? In order to answer this problem independent estimates of deterioration are required.

If the reliabilities and validities of these measuring instruments can be shown to be high, then we shall have produced two measures of schizophrenic deterioration for future use.

IV. RESULTS

(i) *Reliability*

(a) *Constancy of Behaviour.* One of the authors (A.A.B.) administered the standard interview and carried out ratings on sixteen deteriorated schizophrenic patients. Seventeen weeks later this procedure was repeated on the same patients. The correlation between the initial and final standard interview scores was $\cdot 97$, and between the scores on the initial and final rating scales was $\cdot 94$. In neither case was there a significant change in mean scores. These figures are remarkably high, are statistically significant beyond doubt, and indicate extreme consistency of behaviour even over a period of as long as seventeen weeks.

(b) *Agreement Between Interviewers and Raters.* The same sixteen patients were also interviewed and rated by a ward sister independently of the assessment by A.A.B. Correlations between the two interviewers worked out at $\cdot 84$ for the initial scores and $\cdot 86$ for the final scores. For the corresponding initial and final ratings, correlations between raters worked out at $\cdot 90$ and $\cdot 89$ respectively. The mean scores obtained on either the rating scale or the interview were almost identical.

These correlations are especially high when it is realized that the two interviewers comprised a psychiatrist who saw the patients comparatively infrequently, and a ward sister who saw the patients all day and every day. Further, the psychiatrist was male, and the ward sister female. The statistical significance of these correlations is again beyond doubt and the conclusion must be that there is exceedingly high agreement between different members of the hospital staff on both interview and rating scale scores.

In subsequent investigations test-retest and inter-rater/interviewer correlations worked out as follows:

Test-retest

10 patients interviewed by A.A.B.—

Interview repeated 3 weeks later.

Correlation = $\cdot 89$

Mean 1 = $5\cdot 7$

Mean 2 = $5\cdot 9$

10 patients rated by Ward Sister.

Repeated after 1 week.

Correlation = $\cdot 93$

Mean 1 = $12\cdot 2$

Mean 2 = $12\cdot 2$

Inter-Examiner

10 patients rated by 2 Ward Sisters
independently.

Correlation = $\cdot 81$

Mean 1 = $12\cdot 3$

Mean 2 = $12\cdot 1$

10 patients interviewed by A.A.B. and
Ward Sister independently.

Correlation = $\cdot 87$

Mean 1 = $5\cdot 5$

Mean 2 = $5\cdot 4$

These results add further weight to the above conclusions.

(ii) *Validity*

The external criterion for both instruments was obtained in the following manner. Two Ward Sisters from the same long-stay ward were asked to select twenty patients from the ward of 80 patients and to rank them in order of

deterioration. They had to be in complete agreement regarding the rankings of these twenty patients. The twenty patients were then given the standard interview and were also rated on the rating scale.

Correlations between the interview scores and the external criterion (the rankings) and between the rating scale scores and the external criterion worked out at .78 and .96 respectively. These figures, their statistical significance being beyond doubt, indicate that both the standard interview and the rating scale are extremely good measures of schizophrenic deterioration as assessed by the Ward Sisters. The correlation between the rating scale and the standard interview worked out at .79.

Further Analysis of the Rating Scale

Having shown the rating scale to be an extremely good measure of schizophrenic deterioration it seemed to be important to go one step further and analyse it statistically by factor analysis.

Forty-four patients were rated on the scale, and correlations calculated between the items. As the items were originally selected on the grounds that they appeared to be associated with schizophrenic deterioration, one would expect that they should all intercorrelate positively and hence generate a general factor of deterioration. The correlation matrix (Table I) indicates that

TABLE I
Correlation Matrix (decimal points omitted)

	A	B	C	D	E	F	G	H	I	J
A.	()	081	118	007	-129	102	-006	-131	296	079
B.		()	-229	381	595	638	397	495	119	487
C.			()	-010	-115	109	179	093	158	-032
D.				()	375	416	208	290	029	257
E.					()	685	571	399	-136	629
F.						()	429	662	146	582
G.							()	331	236	449
H.								()	165	247
I.									()	150
J.										()

this expectation is fulfilled. Out of forty-five correlations only eight are negative and none of these significantly so. A centroid analysis was carried out on this matrix which yielded two significant factors, a general factor accounting for 33 per cent. and a bipolar factor accounting for 10 per cent. of the total variance. A diagrammatic representation of the two factors is given in Figure 3. This figure will assist the reader to understand the nature of the factors involved.

The first (general) factor is clearly a factor of schizophrenic deterioration, the majority of scales having correlations of .5 or more with this factor. The second (bipolar) factor contrasts two groups of symptoms, the first group comprising restlessness, excitement and aggressiveness, and the second group comprising feeding and dressing difficulties and mutism. This factor might therefore reasonably be named retardation-restlessness. It is interesting to note that items G and J (i.e. work ability and sociability) are almost pure measures of the general factor, while items A and C (night and day restlessness) are almost pure measures of the second factor. These factors are, of course, completely independent of one another.

FIGURE 3

Factor I

+1.0

. Needs dressing fully

Motionless

. No friends
. Incontinent

Mute

. Tube fed

Does no work

. Aggressive

. Awake all night
. Wildly excited

Factor II

+1.0

Factor I	Factor II
+1.0	+1.0
.9	.9
.8	.8
.7	.7
.6	.6
.5	.5
.4	.4
.3	.3
.2	.2
.1	.1
0	0
-.1	-.1
-.2	-.2
-.3	-.3
-.4	-.4
-.5	-.5
-.6	-.6
-.7	-.7
-.8	-.8
-.9	-.9
-1.0	-1.0

The present rating scale therefore can be resolved into two independent components. First is a general factor of schizophrenic deterioration, and secondly a bipolar factor contrasting retardation with restlessness. Though the first factor is the one made use of in the present study, a knowledge of the second factor may prove useful in future work.

V. STANDARDIZATION FOR THE TWO INSTRUMENTS

The mean scores for patients in long-stay wards on both instruments have already been indicated. In a typical long-stay ward in this hospital the interview scores range from 0-10, with a mean score of around 5, while the rating scale scores have a mean of about 12 and range from 0-24. From the nature of the test material it can easily be seen that only patients who are without doubt to some extent deteriorated will score at all highly on these scales. This is in fact the case.

VI. ADDITIONAL DATA

(i) *The Relation of Rating Scale Scores to Length of Illness*

This relationship is best indicated by the following table:

		<i>Length of Hospitalization (in years)</i>					
		0-5	6-10	11-15	16-20	21-25	26-30
Number of patients	..	7	2	15	10	8	3
Mean rating	..	9.7	12.0	10.9	10.9	14.7	12.7

Analysis of variance applied to these data gives an "F" of 1.572 which is not statistically significant. This means that there is no significant relationship between amount of deterioration and length of hospitalization.

(ii) *The Conversion of Interview Scores into Rating Scores*

As the interview scores correlate highly with those obtained on the rating scale, it is fairly easy to predict by the use of regression equations, a patient's score on either of these measures knowing his score on the other. The simplified formulae for these conversions are as follows:

$$\text{Predicted Score on Rating Scale} = 1.3 (\text{Score on Interview}) + 6$$

$$\text{Predicted Score on Interview} = .5 (\text{Score on Rating Scale}) - 1$$

A patient's true score on the rating scale is not likely to be more than about $2\frac{1}{2}$ points away from his predicted score ($\sigma \text{ est} = 2.68$) nor his score on the interview more than $1\frac{1}{2}$ points away from that predicted ($\sigma \text{ est} = 1.59$).

VII. DISCUSSION

It would appear from the above data that the two methods of measuring schizophrenic deterioration introduced in this paper can be relied upon to do the job which was intended for them. Both show extremely high reliability and validity, and it may be well to pause here for a moment to consider the reasons for this.

First and foremost the elements of behaviour which have to be assessed are exceedingly simple and unequivocal. In the interview situation a patient either sits down when instructed to, or he does not, and a patient may have in the ward one friend, two friends, or no friends at all. Behaviour which is broken down into elements as simple as these can be recorded fairly objectively, and this objectivity is no doubt the keynote for the success of the two scales.

Secondly, all the above correlations are exceedingly high. This is due in large measure to the simplicity of the scale items as well as to the objectivity of recording. It is also due to the fact that in each of the experiments reported the groups were deliberately chosen to be as heterogeneous in respect of deterioration as possible. With more homogeneous groups the correlations will, of course, be lower. Nevertheless, scales which do not show high correlations within heterogeneous groups can have little practical value.

The main advantage in using the two scales, apart from their high reliability and validity, lies in their ease of administration. Neither interview nor ratings take more than a few minutes to carry out, and large numbers of patients can be assessed in a relatively short time.

It is of interest to note that there is no significant relationship between length of stay in hospital and deterioration score. This is in accord with clinical experience, as paranoid patients often deteriorate very slowly, while other patients show evidence of advanced deterioration even on admission.

SUMMARY

Two simple methods of measuring schizophrenic deterioration have been introduced. Each has been shown to have satisfactory reliability and validity, and any patient can be assessed on *both* scales in a few minutes. It is suggested that the two scales will be of use in assessing the effects of treating deteriorated schizophrenics as well as in matching schizophrenic groups for research purposes.

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ACETYL CHOLINE AS A THERAPEUTIC AGENT IN MILD PSYCHIATRIC DISORDERS

By

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IN 1950 López-Ibor adapted Fiamberti's use of acetyl choline in schizophrenia for the treatment of psychoneurotic disorders (Fiamberti, 1940, 1950a, b; López-Ibor, 1950, 1952). Very few reports of the efficacy of this treatment have been published and they vary from the enthusiastic (Sargant, 1952; Phillips and Hutchinson, 1954) and the doubtful (Maclay, 1953), to the unequivocally rejecting (Hawkings and Tibbetts, 1956). The latter authors stressed the beneficial psychotherapeutic atmosphere of the clinic, and showed that injections of sterile water produced equally as good results as acetyl choline. This paper is a further attempt to evaluate the specific effect of acetyl choline in the treatment of mild psychiatric disorders.

METHOD AND RESULTS

Cases referred for acetyl choline treatment were selected from a large out-patients clinic. As illustrated in Table I, the majority of these patients had

TABLE I

Illustrating the Type of Case Referred for Treatment by Acetyl Choline and Showing that the Patients who did Not Reply to the Questionnaire were Not Significantly Dissimilar from the Others

	73 Patients Replying to Questionnaire	37 Patients Not Replying to Questionnaire
Average age	34.7 years	35.2 years
Average number injections ..	16.4	14.8
Male/Female ratio	31 M : 42 F	17 M : 20 F
Diagnosis:		
Depressive reactions	45	24
Phobic } reactions	18	4
Obsessive }		
Anxiety reactions	4	2
Hysterical reactions	2	1
Others	4	6
Duration of illness	2.9 years	2.4 years

depressive reactions or a mild obsessive-compulsive state similar to that described by Sargant (1952). Hysterics and patients with a classical obsessional neurosis are not helped by acetyl choline treatment. Only a few patients with overt anxiety were referred, as it was found that the unpleasant side effects of acetyl choline often upset these patients and they discontinued treatment after only one or two injections.

Acetyl choline (Roche) was given in doses of 200 mg. intravenously, starting with 50 mg. and increasing over 4 weeks to the full dose. The injections were given slowly over $\frac{1}{2}$ –1 minute so that the production of severe symptoms

or unconsciousness was avoided. The injections were given at weekly intervals for 30 weeks, though in many cases the course was curtailed. In this investigation an attempt has been made to assess firstly the incidence of improvement in patients having treatment with acetyl choline, and secondly, to assess the specific therapeutic effect of acetyl choline as distinct from the non-specific effects related to attending the clinic.

(a) In the past three years, 110 patients have had acetyl choline and the immediate effect of the treatment was assessed separately from the case notes and by means of a questionnaire. Because of the obvious difficulties, cases were rated simply as improved or not improved. Seventy-three patients replied to the questionnaire and 44 (60 per cent.) of these patients thought that acetyl choline had helped them (Table II). Thirty-seven patients did not reply to the questionnaire. These patients did not seem dissimilar to the main group (Table I). It is to be expected that these 37 patients would have rather worse results

TABLE II

Showing the Incidence of Improvement After Acetyl Choline Treatment in 73 Patients, Comparing the Patients' Own Assessment of Improvement with the Assessment from the Case Notes

Diagnosis				Patients' Assessment	Assessment from Case Notes
Depressive reactions	..	..	28/45	(62%)	26/45 (57.5%)
Phobic } reactions	..	..	11/18	(61%)	10/18 (55.5%)
Obsessive }	..	..			
Anxiety reactions	..	..	2/4		2/4
Hysterical reactions	..	..	1/2		0/2
Others	..	..	2/4		1/4
Total	..	..	44/73	(60%)	39/73 (52%)

than the group who replied to the questionnaire and therefore these latter could not be regarded as representative of the whole group. Theoretically, it is possible either that all these 37 patients improved, or that none improved, when the incidence of subjective improvement for the whole group would fall between 74 per cent. and 40 per cent. Perhaps a closer estimate can be made by using an assessment of improvement as judged from the case notes, where it was thought that 12 of these 37 patients had improved. However the patients who replied to the questionnaire rated themselves slightly better than we had assessed them, in the proportion 1 : 1.14. In this way an estimate can be made that 14 (12×1.4) of the 37 patients considered themselves to have improved, making an improvement rate for the whole group of 110 patients of 58 (53 per cent.).

(b) A controlled investigation was devised whereby the therapeutic effect of acetyl choline could be compared with a therapeutically inert substance, all other factors being kept equal. Calcium gluconate was selected as the control drug. It is not dangerous in the dosage used (5 ml. of a 10 per cent. solution). The side effects produced by intravenous injection of this dose over $\frac{1}{2}$ minute resulted in a generalized feeling of warmth and a burning feeling in the throat, sensations which are similar to those produced by acetyl choline and which last for about the same length of time. Unpleasant side effects to a treatment are bound to have psychological effects which it was felt should be taken into account, and it was essential that no suspicion should be raised among the patients that the injections might differ.

Twenty-five consecutive patients referred to the clinic were given either calcium gluconate or acetyl choline, the selection being done on a random basis by means of a latin square. One of the cases failed to attend after receiving only one injection of calcium gluconate and is not included in the results. Of the remaining 24 cases, 13 had acetyl choline and 11 calcium gluconate. The two series were similar enough for purposes of comparison (Table III).

TABLE III

Patients Receiving either a Placebo or Acetyl Choline, Showing that the Two Groups are Roughly Comparable and Showing the Incidence of Improvement Following a Course of Injections of either Acetyl Choline or a Placebo

			Placebo (11 Patients)	Acetyl Choline (13 Patients)
Average age	.. ..	..	33 years	34 years
Average number injections	.. ..	..	19.5	17
Male/Female ratio	.. ..	..	3 M : 8 F	3 M : 10 F
Diagnosis:				
Depressive reaction	.. ..	..	6	11
Phobic } reaction	.. ..	..	3	1
Obsessive }				
Anxiety reaction	.. ..	..	1	1
Hysterical reaction	.. ..	..	1	—
Average duration of illness	.. ..	..	3 years	4 years
Incidence of improvement:				
Patient's assessment	.. ..	..	9/11	9/13
Doctor's assessment	.. ..	..	9/11	7/13

The results of treatment were assessed both by the patient and the referring doctor. Nine of the 11 patients receiving calcium gluconate were improved (82 per cent.). Slightly lower figures were obtained for the patients receiving acetyl choline, the referring doctor's assessment being 7 improved out of 13 (54 per cent.) and the patients' own assessment for improvement being 9 out of 13 (69 per cent.).

DISCUSSION

It is well known that there is a tendency for improvement to occur in two-thirds of patients with psychoneurotic disorders, and although over 50 per cent. of our 110 patients improved with acetyl choline, control studies with calcium gluconate showed that this was not due to any specific effect of the drug. These results confirm the previous report by Hawkins and Tibbetts (1956), who also found improvement to occur in 50-60 per cent. of patients whether they were given acetyl choline or sterile water. In view of these results the improvement rate of 70 per cent. for the most favourable type of case, as reported by Phillips and Hutchinson (1954), cannot be attributed to a specific effect of acetyl choline.

This conclusion cannot be wholly unexpected, as acetyl choline is rapidly destroyed in the blood, and it is doubtful if, after intravenous injection into the arm, it has any direct action on the brain. Electrical changes in the brain certainly occur after rapid intravenous injection of acetyl choline, but many of these changes are attributable to anoxia (Williams, 1941; Phillips *et al.*, 1952). Other workers are convinced that the pronounced cardiovascular upset following such a rapid injection are responsible for all the changes in the EEG picture (Harris and Pacella, 1943; Ajmone-Marsen and Fuortes, 1949). Masciocchi

(1953) believes that intravenous acetyl choline has a direct effect on the brain, but the changes in the EEG tracings which he uses to illustrate his point are almost certainly muscular in origin.

SUMMARY

1. One hundred and ten patients have been given acetyl choline treatment for mild psychiatric disorders. An estimated 53 per cent. had subjective improvement of their symptoms.

2. A control study of 13 patients receiving acetyl choline and 11 patients receiving calcium gluconate showed no significant difference in the incidence of improvement between the two groups.

3. It was concluded that acetyl choline has no specific therapeutic effect in the treatment of mild psychiatric disorders.

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HUMAN BRAIN LIPIDS AT VARIOUS AGES IN RELATION TO MYELINATION

By

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THE object of this work has been to examine the lipid constituents of human brains at different ages in order to follow the course of increasing myelination.

The principal myelin-forming constituents have been held to be cholesterol, cerebroside and sphingomyelin, as these substances show great increases in the white matter in adult life (Johnson, McNabb and Rossiter, 1949). The sphingolipids (i.e. cerebroside and sphingomyelin) are probably of more importance than the cholesterol, as the nerve sheath is almost entirely composed of them (Edgar, 1955).

Brante (1949) has estimated the lipids in the cortex and white matter at different ages. Johnson *et al.* (1949) give the lipid in the cortex and white matter of neonatal and adult brains.

The sphingomyelin, as estimated by Johnson *et al.* (1949), by difference between the total lipid P and the "KOH-splitable" P, will give unduly high results owing to the inclusion of the Cephalin B. This has been shown to be the case by Dawson (1954) who suggests that it is preferable to assess the sphingomyelin by difference between the total lipid choline and the lecithin choline. Results by both the methods are recorded here.

Cerebroside, as ordinarily estimated from the lipid galactose, includes the ganglioside.

Cephalin B and ganglioside do not contribute to the myelin sheath (Edgar, 1955), and it is important to take this fact into consideration.

Through the kindness of Dr. Brown of Southmead Hospital it has been possible to obtain brains of the following ages: Three brains a few hours after birth; and brains of 2, 4 and 9 days; 2 weeks; and 1, 2 and 9 months. Adult brains of 5, 19 and 65 years were obtained from other sources.

METHODS

The tissue was dried and extracted with 2 CHCl_3 : 1 MeOH and again with CHCl_3 . The extracts were taken to dryness, re-extracted with boiling CHCl_3 , as advised by Brante (1949), filtered, and again taken to dryness. The lipid extract was dissolved in CHCl_3 , made up to volume, and aliquots taken for the various estimations.

Cerebroside, by Brand and Sperry (1941). It was found best to take aliquots containing about 1.5 mg. cerebroside.

Cholesterol, by Sobel and Meyer (1945).

Phosphatide and Sphingomyelin + Ceph. B., by Schmidt, Benotti, Hershmann and Thannhauser (1946).

Material for P estimation destructively digested with sulphuric and perchloric acid, neutralized with NaOH, and P estimated colorimetrically by the molybdic acid reagent.

TABLE I

*Lipids in the White Matter**(Nine Brains from Birth to 2 Months and Three Adult Brains. Results Given as Mean $\pm$ S.E.M.)*

	Per cent. Dry Tissue					Per cent. Fresh Tissue				
	Birth to 2 Months	9 Months	5 Years	Adult	Adult/Infant Ratio	Birth to 2 Months	9 Months	5 Years	Adult	Adult/Infant Ratio
Cerebroside	..	..	8.1	12.0	2.60 : 1	0.52 $\pm$ 0.13	1.67	3.58	3.52	6.80 : 1
Cholesterol	..	..	11.5	14.0	2.60 : 1	0.65 $\pm$ 0.11	2.39	4.17	4.22	6.50 : 1
Phosphatide	..	..	20.7	24.5	1.07 : 1	2.55 $\pm$ 0.29	4.30	7.73	6.87	2.70 : 1
Lecithin	..	..	8.2	8.7	0.75 : 1	1.19 $\pm$ 0.20	1.72	2.59	2.24	1.90 : 1
Sphingomyelin + Cephalin B	..	..	2.2	6.1	3.40 : 1	0.20 $\pm$ 0.08	0.46	1.80	1.72	8.60 : 1
Cephalin A	..	..	10.3	10.4	0.99 : 1	1.16 $\pm$ 0.27	2.13	3.29	2.91	2.50 : 1

TABLE II

*Lipids in the Cortex**(Three Brains from Birth to 2 Months and Three Adult Brains. Results Given as Mean $\pm$ S.E.M.)*

	Per cent. Dry Tissue					Per cent. Fresh Tissue				
	Birth to 2 Months	9 Months	5 Years	Adult	Adult/Infant Ratio	Birth to 2 Months	9 Months	5 Years	Adult	Adult/Infant Ratio
Cerebroside	..	..	4.4	4.2	0.93 : 1	0.60 $\pm$ 0.16	0.64	0.45	0.70	1.16 : 1
Cholesterol	..	..	5.8	5.2	1.10 : 1	0.72 $\pm$ 0.24	0.84	0.77	0.94	1.30 : 1
Phosphatide	..	..	19.3	19.6	0.88 : 1	3.01 $\pm$ 0.62	2.80	2.87	3.32	1.10 : 1
Lecithin	..	..	7.8	6.8	0.66 : 1	0.34 $\pm$ 0.08	0.37	—	1.26	3.70 : 1
Sphingomyelin + Cephalin B	..	..	2.6	7.5	2.90 : 1	1.62 $\pm$ 0.29	1.13	0.56	1.15	0.72 : 1
Cephalin A	..	..	8.9	7.8	0.83 : 1	1.05 $\pm$ 0.34	1.30	—	0.91	0.87 : 1

TABLE III

Sphingomyelin and Cephalin B in the Cortex and White Matter
(Per cent. Dry Tissue)

	White Matter					Cortex							
	Neo-Natal	1 Month	2 Months	9 Months	19 Years	65 Years	Adult/Infant Ratio	Neo-Natal	1 Month	2 Months	9 Months	65 Years	Adult/Infant Ratio
Sphingomyelin	0.5												
	0.1												
	Nil												
	Nil												
Cephalin B	1.2												
	1.5												
	2.1												
	Nil												
	1.2												
	0.1	0.8	1.8	1.7	2.0	2.4	22.0	0.2	0.6	0.7	1.0	2.7	13.4 : 1
	1.2	0.8	1.8	0.5	4.4	3.5	3.3	1.8	3.2	1.3	1.6	4.8	2.67 : 1

TABLE IV

Ganglioside in Relation to Cerebroside in the Cortex and White Matter
(Per cent. Dry Tissue)

	Cortex					White Matter				
	Neo-Natal	1 Month	2 Months	9 Months	65 Years	Neo-Natal	1 Month	2 Months	9 Months	65 Years
Cerebroside	..	..	..	..	..	5.6	4.6	4.5	8.1	12.6
Cerebroside: less neuraminic acid ganglioside	..	..	..	..	..	—	—	—	—	—
Cerebroside: less hexosamine ganglioside	..	..	..	..	..	3.6	3.8	3.6	6.7	11.6

Total Choline, by Glick (1944); *Lecithin Choline*, by Brante (1949). Suspension in both cases made acid with HCl before filtration and precipitation of choline.

Sphingomyelin + Ceph. B. = Total lipid P less "KOH-splitable" P.

Sphingomyelin = Total Choline less Lecithin choline.

Hexosamine, by Elson and Morgan (1933) in hydrolysed lipid extract, with precautions advised by Rondle and Morgan (1955)—glucosamine HCl standard.

Neuraminic Acid, by Klenk (1941). Dried tissue separately extracted. In the absence of a neuraminic acid standard, the value of the normal adult cortex was assumed to be that given in literature.

RESULTS

White Matter

Results for the period up to and including age 2 months have been averaged (Table I) because, with the exception of sphingomyelin, no marked changes were recorded up to this age. Further observations in this critical age group are desirable, since Brante (1949) has recorded increases in both cholesterol and cerebroside at age 2 months (one case).

The maximum increase in cholesterol and cerebroside occur between the ages of 2 and 9 months, and there is a further increase after 9 months to the adult stage.

The total phosphatide increases with age on a wet basis but not on a dry basis.

It will be seen from Table IV that the deduction from the cerebroside of the hexosamine ganglioside does not affect the increases of cerebroside with age after age 2 months. There is no neuraminic acid ganglioside in the white matter (Klenk, 1955).

The estimation of sphingomyelin (Table III) is not very accurate for small amounts, probably as stated by Brante (1949) "owing to differences in the determination of lecithin in relation to total choline". It is considered that the values for the neonatal period may be taken as negligible.

Cortex

The cholesterol and cerebroside show no increase with age (Table II). This also applies to the cerebroside after the neuraminic acid and hexosamine ganglioside have been deducted from it (Table IV).

The sphingomyelin does increase with age, and does not reach a nearly adult value at age 2 months, as it does in the white matter (Table III).

Ester Cholesterol (Table V)

There are very small quantities of this in the human brain. It occurs chiefly in the white matter and is at a maximum in my case at 9 months.

TABLE V

Ester Cholesterol (Per cent. Dry Basis)

			Neo-Natal	1 Month	2 Months	9 Months	19 Years	65 Years
White Matter	..	..	0.6	0.30	0.4	1.5	0.5	Nil
Cortex	..	..	Nil	Nil	0.1	Nil	0.3	0.3

DISCUSSION

It may be of interest to compare briefly these chemical findings in the developing brain with the degree of myelination as judged by the usual histological methods.

Comparison of the chemical results as a whole with the histological staining of myelin by the Weigert-Pal method or its modifications shows only an approximate correlation.

The white matter at 2 months stains more deeply than at the neonatal period, whereas there is no change in the content of cholesterol and cerebroside. The sphingomyelin however does show an increase.

There is only slight histological evidence of myelination in the cerebral white matter at the time of birth, whereas the content of cholesterol and cerebroside is not less than it is at age 2 months. The sphingomyelin content is however, negligible at birth.

The period at about 2 years when the white matter is very appreciably myelinated, does however correspond to a time when there are comparatively large amounts of all three myelin forming constituents. We have not yet obtained a brain of 2 years for analysis but it has been shown that maximum levels are obtained between 9 months and 5 years.

SUMMARY

1. The lipid content of the cortex and white matter of brains at various ages has been assessed, with particular reference to the myelin forming constituents.

2. The neonatal brain contains considerable amounts of cholesterol and cerebroside, but negligible amount of sphingomyelin.

3(a). In the white matter no changes are recorded up to age 2 months, except in the sphingomyelin which increases. The cholesterol and cerebroside increase between 2 months and 9 months, and reach their maximum adult level somewhere between 9 months and 5 years. On a wet basis, the cholesterol, cerebroside and sphingomyelin reach about half their adult value at age 9 months.

3(b). In the cortex, the cholesterol and cerebroside reach adult value at age 2 months. The sphingomyelin reaches about a third of its adult value at 9 months.

4. The highest Adult/Infant ratios are recorded for sphingomyelin, and the lowest for lecithin.

5. The total phosphatide is the only Lipid which, when increased, does so only by virtue of the reduced water content.

6. There is some evidence that the sphingomyelin content (exclusive of Cephalin B) gives the best indication of the degree of myelination up to the age 2 months.

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THE COUNTY REGISTER OF HOUSES FOR THE RECEPTION OF "LUNATICS", 1798-1812

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THE first Act of Parliament which authorized the detention of persons "who, by Lunacy, or otherwise, are furiously Mad, and dangerous to go Abroad" was passed in the twelfth year of the reign of Queen Anne (1714):

"Be it therefore Enacted . . . That it shall and may be Lawful for any Two or more of the Justices of the Peace of any County, Town or Place in *England, Wales* or Town of *Berwick* upon *Tweed*, where such Lunatick or Mad Person shall be found, by Warrant under their Hands and Seals, directed to the Constables, Church-wardens, and Overseers of the Poor of such Parish, Town or Place, or some of them, to cause such Person to be Apprehended, and kept safely Locked up, in such secure Place within the County where such Parish or Town shall lie, as such Justices shall, under their Hands and Seals, direct and appoint . . ."

In 1763 a Committee of the House of Commons enquired into the state of the private madhouses. Expert medical evidence given by Drs. William Battie and John Monro greatly influenced the Committee (Hunter and Macalpine, 1955), and as a result an Act was passed in 1774 "for Regulating Madhouses". It provided for the appointment of five Fellows of the College of Physicians of London as Commissioners with the power of inspecting and licensing all "Houses kept for the Reception of Lunaticks". Their activities were confined "within the Cities of *London* and *Westminster*, and within Seven Miles of the same, and within the County of *Middlesex*". The "Keeper of every such licensed House or Place" was required "within the Space of Three Days after any Patient shall be received . . . (except such pauper Lunaticks as shall happen to be sent there by Parish Officers), to cause Notice thereof to be given to the Secretary to the said Commissioners, which Notice shall contain the Name of every such Person received as a Lunatick into such House or Place, the Name or Names, and Place or Places of Abode, of the Persons by whose Direction such Lunatick was sent to such House or Place, and also the Name and Place of Abode of the Physician, Surgeon, or Apothecary, by whose Advice such Direction was given . . . and the Secretary is hereby required to file and preserve all such Notices, and also to enter, or cause a Copy or Extract thereof to be entered, in the Register".

Outside the area covered by the Commissioners, inspections were to be undertaken by two justices of the peace accompanied by a physician, and the licensing of establishments by the justices of the peace at any general Quarter Sessions. As in the case of the London Area, notification of the receipt of every patient was to be sent "to the Secretary to the Commissioners, at the College of Physicians aforesaid".

* Because the existence of this Act was overlooked by Tuke (1882) in his pioneer survey, later authors such as Jones (1955) who base their work on his have made the same omission. The Act of 1744 which is usually credited with being the first to make such provision, reproduces this same section almost verbatim.

In this way there were started two series of registers, the Town and the Country, which were kept until the 1774 Act was superseded in 1828. We have recently attempted to trace these registers. They were not at the Royal College of Physicians: it is presumed that in 1828 they were handed over to the new Commissioners appointed by the Home Office. The Royal Commission on Public Records in 1912 stated that the registers for the period 1774-1828 were complete, but they are not now in the Public Record Office. We could only trace one volume entitled "Country Register, 1798-1812", in the possession of the Board of Control; the other volumes must be presumed lost.

In a paper on "The comparative prevalence of insanity at different periods", Powell* (1813) pointed out that the registers were too unreliable to attempt any precise assessment of the incidence of insanity. His reasons were that some persons still in "lunatic houses" had been there before the Act was passed, and were consequently never mentioned in the returns; that pauper lunatics were not notifiable, and in some establishments bore "a very large proportion to the whole number confined . . . Other houses on the contrary receive no patients at so low a price as that contracted for by parishes for the relief and support of their paupers visited by this deplorable calamity"; further "some houses return paupers unnecessarily", while no return by law was required of insanity established by a commission in lunacy. Finally, some houses admitted patients but were not licensed, while others were licensed but furnished no returns. Public hospitals of course were exempt. One curious omission was "that no returns have ever been made from any part of the principality of Wales, from which circumstance, and from some enquiries upon the subject, I believe that there is no lunatic house in that part of the kingdom".

Clearly the register does not provide an accurate picture of the total number of insane in country asylums in private hands. Nevertheless, much valuable information can be obtained from it: it allows some estimate to be made of the size of establishments, at the same time providing an almost complete list of them. Further, the names of physicians, surgeons and apothecaries which recur, suggest an interest in insanity where this had in some instances not been known before. We therefore present a study of its contents as source material of the history of insanity in England.

THE COUNTRY REGISTER, 1798-1812

The register, a thick folio bound in vellum, comprises records of 1,788 patients returned during the period covered. The main body of the work consists of what was begun as an alphabetical record of proprietors of private madhouses, with a list of patients admitted, together with the date of admission and of notification to the College, with columns showing the person by whose direction the patient was admitted (usually a near relative), and the name and town of residence of the physician, surgeon or apothecary who advised admission. The status of the practitioner is signified by either "Doctor" or "M.D." in the case of physicians; by the title "Surgeon", sometimes abbreviated "Surg." or simply "S." in the case of surgeons; and by "Apy" in the case of apothecaries. For some patients two practitioners are named. The volume has an index of patients at the beginning and an index of houses at the end.

From the hundreds of practitioners named we have singled out those that already have a place in the history of medicine or psychiatry, such as Dr. Edward Jenner and Dr. Samuel Foart Simmons, as throwing an interesting

* Dr. Richard Powell was Secretary to the Commissioners.

sidelight on their practice; and those whose names recur to an extent which strongly suggests that they made a specialty of "insanity". No attempt has been made to provide biographical details, though we refer here and there to authorship where this relates directly to the subject. Some of these names appear in the 1815 and 1816 Parliamentary Reports on Madhouses in England, where will also be found illuminating statements regarding current practice and conditions.

TABLE I

*Licensed Madhouses Outside a Seven-Miles Radius of the Cities of London and Westminster and the County of Middlesex, 1798-1812**

No.	Proprietor	Location	Total Admissions	Period	
				From	To
1	Mr. Thos. Arnold	Leicester	142	Dec. 1801	Oct. 1812
2	Mr. Richard Browne	Great Foster House, Egham, Surrey	72	Nov. 1801	Sept. 1812
3	George Chadwick	Lichfield	1	Nov. 1809	
4	Mr. A. Chew	Billington, Lancashire	88	Jan. 1802	Nov. 1812
5	Mr. Thos. Bakewell	Spring Vale, nr. Stone, Staffordshire	41	Oct. 1808	Dec. 1812
6	Mr. Joseph Mason Cox	Fishponds in the County of Gloucester and at Stapleton in the same County	183	Oct. 1801	Nov. 1812
7	William Crook	Laycock, Wiltshire	11	Mar. 1801	Mar. 1812
8	Mr. John Edwards	Blakely Asylum, Manchester	75	Dec. 1801	Sept. 1812
9	Mr. and Mrs. William and Caroline Finch	Laverstock, Wiltshire	162	Dec. 1801	Nov. 1812
10	Edward Long Fox	Clover Hill, Gloucestershire and Brislington, nr. Bristol, Somerset	51	Nov. 1803	Oct. 1812
11	Joanna Harris	Hook Norton, Oxfordshire	56	Oct. 1801	Oct. 1812
12	Mr. G. Hammond	Waltham Abbey, Essex	—	—	—
13	Zachariah Jefferys	Kingsdown, Box, Wiltshire	59	Nov. 1801	Nov. 1812
14	Mr. F. Irish	Frimley Lodge, Surrey	15	Apr. 1802	May 1810
15	Samuel Marriott	Hathern, nr. Loughborough, Leicestershire	8	Aug. 1810	June 1811

* The order and form of entry of proprietor and location is that of the register.

TABLE I—*Continued*

No.	Proprietor	Location	Total Ad- missions	Period	
				From	To
16	James Johnson	Shrewsbury	96	Oct. 1801	Nov. 1812
17	Justinian Mercer	Halstock, Dorsetshire	53	July 1802	Dec. 1812
18	Thomas Burman	Henley-in-Arden, Warwick- shire	46	Dec. 1808	Nov. 1812
19	Samuel Newington	Ticehurst, Sussex	97	Apr. 1802	Dec. 1812
20	Samuel Proud	Bilston, Staffordshire	40	Oct. 1801	Oct. 1812
21	John Blunt	Warwick; removed 1809 to Great Wigston, Leicester- shire	32	June 1809	Nov. 1812
22	James Parkinson	Hollingreave within Haberg- ham Eaves, Lancashire	12	May 1810	Sept. 1812
23	William Perfect; in 1809 succeeded by George Perfect	West Malling, Kent	46	Oct. 1801	Sept. 1812
24	Stephen Pellett	St. Albans, Herts.	11	Aug. 1802	Apr. 1809
25	Edward Rigby	Lakenham, Norfolk	26	Nov. 1801	July. 1812
26	William Ricketts	Droitwich, Worcestershire	2	April	1802
27	Dr. Steavenson	Newcastle-upon-Tyne	51	Mar. 1802	Sept. 1812
28	James Stilwell	Stoke next Guilford, Surrey	24	Oct. 1802	Dec. 1812
29	Dr. Willis	Gretford, Lincolnshire	46	Dec. 1801	Dec. 1812
30	John Goward	Framlingham, Norfolk	4	Apr. 1803	Aug. 1804
31	Dr. Fawssett	Low Toynton, nr. Horn- castle, Lincolnshire	51	June 1803	Nov. 1812
32	Mr. Jacob	Hadham, Hertfordshire	40	Mar. 1803	Sept. 1812
33	William Belcombe and A. Mather	Clifton, nr. York	7	July 1811	May 1812
34	Mr. Jollye	Lodden, Norfolk	61	Oct. 1803	Sept. 1812

TABLE I—*Continued*

No.	Proprietor	Location	Total Admissions	Period	
				From	To
35	William Terry	Sutton Coldfield, Warwickshire	11	Jan. 1793	July 1812
36	Mrs. Ann Cocks	Hertford	1	Oct. 1805	
37	Mr. and Mrs. E. Gibbs	Henley-in-Arden, Warwickshire	4	May 1806	Nov. 1811
38	Mr. Charles Finch	Moortoon House, nr. Ringwood, Hampshire	21	Apr. 1807	May 1812
39	Thomas Stafford	Long Bennington, Grantham, Lincolnshire	13	Nov. 1810	Sept. 1812
40	John Beal	Gate Helmsley, in the Liberty of St. Peters, York	8	Mar. 1812	Oct. 1812
41	Alexander Mather	Clifton, nr. York	2	Dec. 1812	
42	J. Squires	Walton Lodge, nr. Liverpool	21	Nov. 1812	Dec. 1812

(1) "Mr. Thomas Arnold", M.D., F.R.C.P.(Ed.), was the famous Leicester physician, psychiatrist and botanist, and friend of William Withering. His *Observations on Insanity* (1782-86) reached two editions. Judging from the number of patients admitted, his asylum was the third largest in the provinces. The physicians on whose advice patients were admitted included himself, his son and successor, Dr. William Withering Arnold; Dr. David D. Davis of Sheffield, the translator of Pinel; Dr. Samuel Foart Simmons of London, physician to St. Luke's Hospital and for a time psychiatrist to George III; Dr. John Johnstone of Birmingham, author of *On Madness* (Birmingham, 1800); Dr. William Currie of Chester; Dr. Kerr of Northampton; and Dr. Edward Alexander of Leicester.

Among the surgeons occur the names of Mr. Frederick Thackeray of Cambridge; Mr. Thomas Kirkland of Ashby-de-la-Zouch, son of the Thomas Kirkland, surgeon and author on medical subjects who was involved in Earl Ferrers' case; and Mr. Thomas Paget, Arnold's surgical colleague on the staff of Leicester Infirmary, who admitted 36 patients, more than a third of the total.

(2) Dr. S. F. Simmons appears again with Dr. William Heberden the younger. Dr. Pope of Staines sent 4 patients.

(4) Drs. J. P. Brandreth of Liverpool and John Ferriar of Manchester (author of *An Essay towards a Theory of Apparitions*, 1813), among others advised admission of patients. Mr. Chew himself, described as a surgeon, admitted 9 patients, while the name of Mr. Richard Hardy, surgeon, of Whalley, occurs no less than 24 times.

(5) There is a charming illustration of Mr. Thomas Bakewell's house in "A Letter addressed to the Chairman of the Select Committee of the House of Commons appointed to enquire into the State of Mad-houses" (Stafford, 1815). He also wrote *The Domestic Guide in Cases of Insanity*, 1805. In the former he names Dr. Astbury as physician, and Mr. Forster as surgeon to the house, the latter admitting 5 patients.

(6) Apparently the largest house in the provinces was that of Mr. Joseph Mason Cox, M.D., whose *Practical Observations on Insanity*, 1804, reached three editions and was translated into French and German. Tuke (1882) called it "the best medical treatise of the day on insanity". Physicians predominate among those advising admission. Well-known names that occur include Dr. Thomas Beddoes of Clifton, who sent 4 patients; Dr. R. W. Darwin of Shrewsbury, son of Erasmus Darwin and father of Charles Robert Darwin, 1; Dr. Richard Fowler of Salisbury, 2; Dr. Hird of Leeds, 2; Dr. Edward Jenner of Berkeley, of vaccination fame, whose interest in affections of the mind is demonstrated in *Classes of Intellect*, (Cheltenham, 1807) and *On the Influence of Artificial Eruptions* (London, 1822), 3; Dr. C. H. Parry of Bath, 4; Dr. S. F. Simmons, 1; Dr. W. K. Crawford of Bath and Clifton, 8; Dr. Lovell of Bristol, 4; Dr. Kidd of Oxford, 1; Mr. F. Thackeray, 2; Mr. Bompas, surgeon of Fishponds who succeeded Dr. Cox as proprietor, 5. In 1848 when the establishment had passed into the hands of his son, Dr. Joseph Carpenter Bompas, it was made the subject of an extensive enquiry (Evidence . . . on Fishponds, 1848).

(7) William Crook made returns unnecessarily, all his patients being parish poor admitted by the direction of ministers, church wardens and parish overseers.

(8) Eighteen of the patients were admitted on the advice of Mr. Charles White, famous Manchester surgeon and obstetrician, and surgeon to Manchester Lunatic Hospital. Fifteen more patients were admitted through Dr. R. Foxley, of Manchester, and others came from Dr. Alexander Taylor, Dr. W. Currie and Dr. Cowling.

(9) Mr. and Mrs. Finch's house admitted the second largest number of patients, among them patients of Dr. R. Fowler, Dr. C. H. Parry, Dr. S. F. Simmons, and 6 from Dr. W. Moore of Newport, Isle of Wight.

(10) Patients came from Dr. C. H. Parry and Dr. W. K. Crawford.

(11) Drs. Wall and Kidd of Oxford sent patients.

(15) Dr. Thomas Arnold advised the admission of 2 patients.

(16) Seven patients were admitted by Dr. R. W. Darwin of Shrewsbury, and 11 by Mr. W. Clement, apothecary of the same city.

(17) Eight patients admitted by Mr. Charles Hayman, surgeon of Axminster; 1 by Mr. J. Dunston, surgeon of London, son of Mr. Thomas Dunston, Master of St. Luke's Hospital, London.

(18) Drs. Edward and John Johnstone advised the admission of 2 patients each.

(19) Patients came from Dr. Thomas Monro, London, physician to Bethlem Hospital; Dr. Pellett of St. Albans, perhaps the owner of the madhouse (see No. 24); Dr. S. F. Simmons; and Dr. Willis of Greford (see No. 29). Dr. Robert Watts of Cranbrook admitted 7, and Mr. Satterley, apothecary of Hastings, 5.

(20) Drs. John Johnstone and R. W. Darwin sent 1 patient each, while Mr. R. Price, surgeon, of Bilston, sent 10.

(21) Dr. E. Alexander admitted 3 patients; Mr. T. Paget 2, Mr. Edward Blunt, surgeon of Great Wigston, 6. Two patients were admitted by the direction of two magistrates advised by a surgeon.

(22) Mr. Thomas Grimeshaw, surgeon of Burnley, sent 9 patients.

(23) William Perfect (1737-1809), "one of the most significant of 18th century authors" (Walk, 1954) of works on insanity; George Perfect was his son. One patient was admitted by the direction of the "Commissioners of the Sick and Wounded", and 1 by Dr. J. M. Cox.

(24) Patients came from Dr. Thomas Monro, Sir Walter Farquhar, London, physician in ordinary to the Prince of Wales; and in November, 1807, 1 from Mr. John Haslam, apothecary of Bethlem, author of various works on insanity, and with his chief Dr. Thomas Monro dismissed from Bethlem Hospital after the Parliamentary Enquiry, 1815.

(25) Four patients sent by Dr. Warner Wright of Norwich.

(27) Four patients came from Dr. R. Pringle, Alnwick; 2 from Dr. J. Armstrong, North Shields; 1 from Sir Alexander Douglas, Dundee; and 5 from Mr. A. E. Winfield, surgeon, Newcastle.

(28) Patients came from Dr. S. F. Simmons, Dr. R. Pope, and 5 from Mr. Woodyer, surgeon of Guildford.

(29) Dr. Francis Willis, the proprietor, attended George III: his establishment became fashionable and patients included a prince, a baron and two knights. For almost half the patients no medical practitioner is recorded. Most were admitted on the advice of one of the Willis family: Dr. Francis himself, or one of his sons, Dr. John Willis or Dr. Robert Darling Willis. Dr. Arnold sent 1, as did Dr. Cox of Bristol and Dr. Henry Ainslie, physician to St. Thomas's Hospital. Four came from Dr. Kerr of Northampton; 3 from Ireland; only 3 patients were sent by surgeons, and 1 by an apothecary.

(31) Mr. Taylor, surgeon, Horncastle, sent 14 patients; Thomas Taylor, apothecary of the same town, 4; and Mr. J. Haslam 1 in October, 1803.

(32) Sir Walter Farquhar sent 2 patients, and 1 each came from Dr. John Haygarth of Bath, author of *Of the Imagination as a Cause and a Cure of Disorders of the Body* (Bath, 1800); Dr. J. C. Lettsom of London; and Dr. S. F. Simmons. Mr. Cooper, apothecary of Hadham sent 5, Mr. R. Harrison, surgeon of Hadham, 4.

(34) Fifteen patients were admitted by Mr. J. Gillings, surgeon of Lodden.

(35) One patient was admitted by Sir Lucas Pepys of London, physician to George III.

(42) Nineteen of the patients were admitted by Dr. J. P. Brandreth of Liverpool in the space of one month, which suggests they were transferred from another house with which Dr. Brandreth was connected.

DISCUSSION

It is unfortunate that the London Register is not now available for similar study. Powell (1813) compared the total number of admissions in the Town and Country Registers for 5-year periods commencing in 1775, and ending in 1809. For each lustrum the figures for admissions in the London area were between 2 and 3 times as great as those in the provinces. Thus in the 10 years 1800-1809 inclusive, 3,337 patients were entered in the Town Register, compared with 1,397 in the Country Register. This difference may perhaps be accounted for by the greater vigilance of the London Commissioners in ensuring accurate returns; by the greater number of wealthy persons living in London; by diminished tolerance of mental abnormality in a large city; and by a greater number of private madhouses in the metropolis, to which patients came from the country.

SUMMARY

For the period 1798-1812 the provincial madhouses in England licensed under the "Act for Regulating Madhouses" of 1774 are listed, with the number of patients received into each as recorded in the Register of the Commissioners of the College of Physicians of London. Attention is drawn to some names well known in the history of psychiatry, as well as to some whose practice in the field of insanity is revealed by this study.

ACKNOWLEDGMENTS

We thank Mr. H. R. Green and the Board of Control for their efforts in trying to locate the Registers, and for permission to examine and report on the Country Register, 1798-1812.

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Reviews

The Practice of Dynamic Psychiatry. By JULES H. MASSERMAN, M.D. W. B. Saunders Company, Philadelphia and London, 1955. Pp. 790. Price 84s.

Professor Masserman has the knack of conveying the flavour of his personality in print. Those who have heard him speak will have no difficulty, on reading this book, in recalling the unselfconscious enthusiasm with which he expounds a concept or the vividness with which he describes a patient. He is never dull, even if he is sometimes diffuse and—despite his own advice to the contrary—given to the occasional use of jargon: for example, “Ur-defenses” (why not “primitive”?).

This is a massive work which provides continually interesting and constructive reading for those who are already well informed psychiatrically; and although few will find it possible to go all the way with the author in everything he says, there are even fewer who would not benefit from a leisurely and contemplative study of it.

Masserman's concept of “biodynamics”—the correlation of psychological and physiological concepts of behaviour into a single comprehensive system—is already known through his *Principles of Dynamic Psychiatry*, to which the present volume is essentially a sequel.

In keeping with the tenets of psychodynamically oriented thought, Masserman lays little stress on categorical diagnosis or disease entities, if, indeed, he is prepared to recognize the latter at all, so far as the greater part of the psychiatric field is concerned. So the reader who is looking for an easy, slick, didactic system of case-taking with a view to mechanical categorical diagnosis and treatment will not find it here. On the other hand, he will find a keenly insightful grasp of the immense and varied complexities of human behaviour, normal and morbid, and a realistically balanced judgment that reflects mature clinical experience and shows what can and cannot be done for given patients in given circumstances. One almost gets the impression of sitting at the author's elbow while he is interviewing patients—his exposition of the technique is first-rate—paying greater heed to the prospects of getting the patient back on his feet again than to the semantic dementia and the internecine partisanship with which psychiatry is still bedevilled. Between cases, as it were, the author touches upon sociology, philosophy, contemporary schools of psychiatry, mythology and even metaphysics and other kindred topics in their clinical relationships, as well as putting in a pithy, thumbnail historical sketch wherever it is helpful as a background to the making of a particular point. But when it comes to formulations of recommendations for treatment and disposal he comes down to earth and provides an excellent series of draft suggestions to indicate the sort of thing a psychiatrist might say to, for instance, a family doctor, a court, a social counsellor or an insurance company about the patient under review.

Many British readers may think, however, that he places too little value on genetic and constitutional factors and too much on extrinsic circumstances; but in practice, the latter are more modifiable than the former and this is, after all, an exposition of the management of modifiable factors.

There are 114 case reports, some of considerable length, illustrating points made in the text; but they do not make tedious reading. One that appealed particularly was entitled “Situational reaction; indirect iatrogenic trauma”. The cases range over a very wide spectrum and include examples of premarital counselling, vocational suitability, political subversion, compensation neurosis, reports to courts of domestic relations, hypnotic regression and sexual inversion. Occasionally one encounters something more familiar—for example, schizophrenia or a Korsakoff syndrome.

There are some useful appendices, including those on alcoholism, the training of the psychiatrist and mental hygiene, and there is an intriguing section in the book itself dealing with the psychiatrist as a person.

The author ranges considerably beyond the limited field of formal mental illness. He makes no bones about his expansionist outlook and refers to "the enlistment of the psychiatrist's knowledge of and respect for humanity in the challenge of keeping mankind alive and happy here on earth", which he regards as "the greatest current task of psychiatry".

It is to be hoped that the resurgence of reaction to excessive preponderance of psychodynamics, which has been apparent in this country for some time, will not prevent even the most diehard from giving careful and, if possible, unprejudiced consideration to this learned and highly instructive work.

IAN SKOTTOWE.

A Handbook of Hospital Psychiatry: A Practical Guide to Therapy. By LOUIS LINN, M.D. International Universities Press, Inc., New York, 1955. Pp. 560. Price \$10.00.

This book lives up to its title. It is essentially a practical manual showing how the various resources of the average mental hospital can best be deployed in the interests of the treatment of patients, individually and collectively. The author starts with an outline of individual psychotherapy followed by group psychotherapy, the physical treatments, recreation and occupation. He then deals with the treatment team—the social worker, the psychologist, the nurse, and, many will be glad to see, the chaplain, as well as the possibilities of using volunteer workers. This is followed by a large section dealing with groups of patients for whom special consideration is needed; for example, chronic patients, the aged, alcoholics, ex-servicemen, criminals and those who have protracted physical illness. An interesting chapter is entitled "Architecture as Therapy".

Many day to day administrative matters are comprehensively dealt with, and although there is much that is of value in this, allowance has to be made not only for minor cultural differences between American and British patients, but also for the predominantly much greater size of the State Hospitals in America.

The book concludes with a section entitled "The Community". In this, chapters are devoted to the relatives of patients and the most helpful ways of dealing with them, out-patients care, family care, the education of the public and the use of the mental hospital in civil emergencies. There are useful appendices, on among other topics, library services, and a home training programme for retarded children.

This book would be useful to all those concerned in the administration of the larger mental hospitals in this country. It might well form a focal point for discussion and review at a staff meeting or conference of the type that is now happily becoming customary in most progressive centres. Discussion of its contents would certainly lead to stimulating and probably fruitful ideas.

IAN SKOTTOWE.

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Cerebral Lesions met with in Epileptics. <i>Scholz, W.</i> 43		
Sclerosis of Ammon's Horn in Epileptics. <i>Morel, F., and Wildi, E.</i> 61		
Epileptogenic Leisons. <i>Penfield, W.</i> 75		
Lobar Sclerosis in Epilepsy and Encephalopathy in the New Born. <i>Norman, R. M.</i> .. 89		
An Anatomopathological Study of 36 Cases of Temporal Epilepsy Operated On. <i>Maspes, P. E., et al.</i> 103		
Introduction to the Anatomy of the Rhinencephalon. <i>Drooglever Fortuyn, J.</i> .. 115		
The Epileptogenic Action of Streptomycin, of Terramycin and of Penicillin-Streptomycin on Application to the Cortex. <i>Ectors, L.</i> 135		
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Brain-stem Encephalitis and Epidemic Vertigo. <i>Möller, F.</i> 107		
	 ACTA PSYCHIAT. NEUR. SCAND. SUPPT.	 1955
Individual Traits and Morbidity in a Swedish Rural Population. <i>Essen-Möller, E.</i> No. 100		
Studies in Neuroses. <i>Erlinger, L.</i> No. 101		
Prenatal and Paranatal Factors in the Development of Childhood Behaviour Disorders. <i>Rogers, M. E., et al.</i> No. 102		
Attempted Suicide. <i>Ettlinger, R. W., and Flordh, P.</i> No. 103		
Diagnostic Studies in Prematures. <i>Uddenberg, G.</i> No. 104		
The Rhythm of Epileptic Attacks and its Relationship to the Menstrual Cycle. <i>Almqvist, R.</i> No. 105		
Report of the Eleventh Congress of Scandinavian Psychiatrists, 1955 No. 106		
Variations in Personality. <i>Nyman, G. E.</i> No. 107		
Dedicated to Carl J. Munch-Petersen No. 108		
On the Correlation Between the Function and Structure of Nerve Cells. <i>Vraa-Jensen, G.</i> No. 109		

VOL. 60

AM. J. MENT. DEFIC.

APRIL, 1956

- Friedreich's Ataxia with Initial Oligophrenia in Siblings. *Gibson, R.* 776
- Effects of Reserpine on Emotionally Maladjusted High Grade Mental Retardates. *Kirk, K. L., and Bauer, A. M.* 779
- An EEG Survey with Activation Techniques of "Undifferentiated" Mental Deficiency. *Walter, R. D., et al.* 785
- Non-convulsive Electrical Cerebral Stimulation in Oligophrenia. *Morris, J. V., et al.* 792
- The Association of Oligophrenia and Dyskeratoses. IV. *Ewing, J. A.* 799
- The Use of the Marbleboard Test to Measure Psychopathology in Epileptics. *Shaw, M. C., and Cruickshank, W. M.* 813
- The Incidence of Brain Injury in Public School Special Classes for the Educable Mentally Handicapped. *Beck, H. S.* 818
- The Psychologist's Concept of his Function in Institutions for the Mentally Retarded. *Berger, A., and Waters, T. J.* 823
- Training Outside the Walls. *Fitzpatrick, F. K.* 827
- The Pointing Scale Method. *Katz, E.* 838
- The Use of the Columbia Mental Maturity Scale with Cerebral Palsied Children. *Canter, A.* 843
- Changes of Psychometric Test Results in Mental Defective Employment Care Patients. *Marchand, J. G., Jun.* 852

VOL. 25

AM. J. ORTHOPSYCHIAT.

APRIL, 1955

- The Psychoanalytic Play Technique. *Klein, M.* 223
- Psychodynamics of Child Delinquency. *Karpman, B., et al.* 238
- Education in a Communal Village in Israel. *Spiro, M. E.* 283
- The Hospitalized Child. *Jensen, P. A., et al.* 293
- Reading Disability. *Fabian, A. A.* 319
- Juvenile Diabetes and its Psychiatric Implications. *Falstein, E. I., and Judas, I.* 330
- Five Failing College Students. *Sarnoff, I., and Raphael, T.* 343
- Methodology of the Yale Rooming-In Project on Parent-child Relationship. *Klatskin, E. H., and Jackson, E. B.* 373
- Is Trying Enough? *Pariente, E., et al.* 398

JULY

- The Contribution of Orthopsychiatry to Clinical Psychology, Psychiatry and Social Work. *Tulchin, S. H., et al.* 445
- Progress in Orthopsychiatry 1955. *Tulchin, S. H., et al.* 475
- Preliminary Appraisal of an Auditory Projective Technique for Studying Personality and Cognition. *Daids, A., and Murray, A. H.* 543
- Personality as a Determinant of Performance. *Sontag, L. W., et al.* 555
- The Use of a Bender Gestalt Maturation Level Scoring with Mentally Handicapped Children. *Ketler, J. E.* 563
- Therapeutic Play Techniques. *Lowrey, L. G., et al.* 574
- The Psychological Problem of the Congenitally Blind Child. *Cole, N. J., and Tabaroff, L. H.* 627

OCTOBER

- The Role of Residential Treatment for Children. *Mayer, M. F., et al.* 667
- Ontogenetic Changes in Adolescence Reflected by the Drawing-Human-Figure Technique. *Morris, W. W.* 720
- Observations on the Significance of Animal Drawings. *Schwartz, A. A., and Rosenberg, I. H.* 729
- Therapeutic Play Technique. *Lowrey, L. G.* 747
- Psychological Implications of Breathing Difficulties in Poliomyelitis. *Seidenfeld, M. A.* 788
- Maternal Influence in the Development of Moral Masochism. *Bromberg, N.* 802
- Some Problems of Treatment Arising from the Federal Loyalty and Security Program. *Kaufman, C. A., and H.* 813
- The Treatment of Emotionally Disturbed Children in a Therapeutic Nursery. *Alpert, A.* 826
- Guide to the Therapy of the Alcoholic. *Cook, R. S.* 835

VOL. 26

JANUARY

1956

- Responsibility for Leadership in Mental Health. *Greenwood, E. D.* 1
- Qualifications for Psychotherapists. *Welsch, E. E., et al.* 35
- A Study of Family Diagnosis. *Ackerman, N. W., and Behrens, M. L.* 66
- The Influence of Degree of Flexibility in Maternal Child Care Practices on Early Child Behavior. *Klatskin, E. H., et al.* 79
- The Role of Deviant Maturation in the Pathogenesis of Anxiety. *Caplan, H.* 94
- Anxiety Neuroses as a Cause of Behavior Disorders in Children. *Blau, A., and Hulse, W. C.* 108

Some Observations on Superstition in Contemporary Life. <i>Marmor, J.</i>	119
A Study of Certain Epidemiological Factors in a Group of Children with Childhood Schizophrenia. <i>Bender, L., and Grugett, A. E.</i>	131
Ego Reinforcement in the Schizophrenic Child. <i>Spotnitz, H., et al.</i>	146
Asthma in Mother and Child as a Special Type of Intercommunication. <i>Coolidge, J. C.</i>	165
Ego-strengthening Aspects of Hostility. <i>Fried, E.</i>	179

VOL. 35 AM. J. PHYS. MED. APRIL, 1956

Influence of Creatine Precursors and High Energy Phosphates on Convalescence from Poliomyelitis. <i>Jones, A. C.</i>	70
Results of Bilateral Intermediate Midbrain Crusotomy in Seven Cases of Severe Athetotic and Dystonic Quadriparesis. <i>Meyers, R.</i>	84

VOL. 112 AM. J. PSYCHIAT. APRIL, 1956

Egas Moniz. <i>Freeman, W.</i>	769
Stress and Emotional Health. <i>Whitehorn, J. C.</i>	773
Clinical Investigation of Chlorpromazine and Reserpine in Private Psychiatric Practice. <i>Bennett, A. E., et al.</i>	782
*Clinical and EEG Investigation on Largactil in Psychosis. <i>Szatmari, A.</i>	788
Evaluation of Convulsive and Subconvulsive Shock Therapies Utilizing a Control Group. <i>Ulett, G. A., et al.</i>	795
Reaction Time Responses by Schizophrenics, Mental Defectives and Normal Adults. <i>Tizard, J., and Venables, P. H.</i>	803
Blood Pressure Responses of Chronic Schizophrenic Patients to Epinephrine and Mecholyl. <i>Geocaris, K. H., and Kooiker, J. E.</i>	808
The Psychotherapy of the Suicidal Patient. <i>Moss, L. M., and Hamilton, D. M.</i>	814
Preliminary Report on the Psychiatric Treatment of Prisoners at the California Medical Facility. <i>Showstack, N.</i>	821
Diagnosis and Treatment of the Phobic Reaction. <i>Tucker, W. I.</i>	825
The Psychiatric Facilities of Chicago and Surroundings. <i>Gerty, F. J.</i>	837

Clinical and Electroencephalogram Investigation on Largactil in Psychosis (Preliminary Study)

1. Experimental investigations have been carried out with Largactil on chronic and acute mental patients.

2. The over-all improvement in chronic cases was 69 per cent. and in acute cases 60 per cent.

3. However, the transitory effects in acute cases indicate that while Largactil is extremely valuable in chronic psychosis, in acute psychotic breakdowns, it has value only as a sedative.

4. Electroencephalogram investigations showed that Largactil markedly decreases the muscle artefacts, decreases the frequency, and increases the voltage, causing a mild progressive synchronization and, in epileptics, it lessens the convulsive threshold.

5. In spastics it decreases spasticity through intravenous route, as tested by electromyogram.

(Author's Abstr.)

MAY

*How Brain Lesions Affect Normal and Neurotic Behavior. <i>Masserman, J. H., and Pechtel, C.</i>	865
Psychoses and Allergy. <i>Freedman, D. X., et al.</i>	873
Psychiatric Disorders Among Negroes. <i>Schermerhorn, R. A.</i>	878
A Preliminary Psychiatric Study of Attempted Suicide as Seen in a General Hospital. <i>Sifness, P. E., et al.</i>	883
Adjustment of Siblings in Large Families. <i>Bossard, J. H. S., and Boll, E. S.</i>	889
Methods of Administration of Succinylcholine Dichloride in ECT. <i>Impastato, D. J., and Berg, S.</i>	893
Chlorpromazine. <i>Cowden, R. C., et al.</i>	898
Discharge and Remission Rates in 4,254 Consecutive First Admissions of Schizophrenia. <i>Israel, R. H., and Johnson, N. A.</i>	903
Is it Safe to Withdraw Sedative Drugs? <i>Levin, M.</i>	910
Simultaneous Occurrences of Schizophrenia in Identical Twins. <i>Solomon, R., and Bliss, E. J.</i>	912
The Hysteroid Aspects of Hypnosis. <i>Meares, A.</i>	916
Psychiatry in the Far East. <i>Bowman, K. M.</i>	919
Learning Versus Lesions as the Basis of Neurotic Behaviour. <i>Wolpe, J.</i>	923
Fatal Acute Aseptic Necrosis of the Liver Associated with Chlorpromazine. <i>Elliott, R. N., et al.</i>	940

How Brain Lesions Affect Normal and Neurotic Behavior. An Experimental Approach

Over a period of 6 years 50 cats and 40 monkeys were closely observed for (1) their individual and social characteristics; (2) their capacity to learn various skills; and (3) the form and persistence of the experimental neuroses induced in 23 cats and 18 monkeys by exposure

Regional Differences in Seizure Susceptibility in Monkey Cortex

Experiments were performed on eight monkeys in order to investigate the capacity of different cortical regions to initiate spreading seizure discharge upon direct stimulation.

It was found that the "epileptogenic" cortical zones were located in portions of the motor and premotor cortex, posterior cingulate region, superior temporal gyrus and tip, and parietal area. Other surface areas displayed little or no propensity to develop spreading after-discharge.

In these experiments, the subcortical nuclei most commonly involved in the cortically induced seizures were the reticular formation, septal region, and amygdala.

An inherent tendency of cells in the described cortical loci to respond to local stimulation by exhibiting after-discharge, and their functional relations with subcortical nuclei known to exert diffuse influences upon the central nervous system, may both be important factors in the initiation and spread of seizures.

(Authors' Abstr.)

A Psychiatric Study of Attempted Suicide in Persons Over Sixty Years of Age

Nineteen patients aged 60 and over were interviewed and examined immediately following a suicide attempt. These 19 patients were part of a larger study of 109 patients who had attempted suicide.

Every one of the 19 older patients had a clinically diagnosable illness. There were nine patients with a psychotic depression, five with a chronic brain syndrome (dementia), three with an acute brain syndrome (toxic psychosis), and two with chronic alcoholism. Thus, 89 per cent. of these patients had a psychotic illness. These findings concerning diagnosis contrasted with those in the younger group, aged 59 and under.

The majority of the suicide attempts in the elderly patients were serious (genuine).

Most of these patients suffered from a treatable (psychotic depression) or reversible (acute brain syndrome) disease. Therefore, many of them can be returned to society as useful citizens if a subsequently successful suicide is prevented.

The immediate management of these patients consists of hospitalization in order to treat the underlying illness and to prevent a successful suicide.

A follow-up study of 23 months showed that two patients, one of whom had a psychotic depression and the other an acute brain syndrome, had committed suicide.

(Authors' Abstr.)

APRIL

The Surgical Treatment of Intracranial Aneurysms. <i>Hamby, W. B.</i>	345
The Propagation of Cortical After-Discharge Through Subcortical Structures. <i>Poggio, G. F., et al.</i>	350
*Pharmacotherapeutic Evaluation and the Psychiatric Setting. <i>Sabshin, M., and Ramot, J.</i>	362
*Neurophysiologic Effects of Electrically Induced Convulsions. <i>Aird, R. B., et al.</i>	371
The Concept of Pseudofeble-mindedness. <i>Benton, A. L.</i>	379
*Autonomic Pharmacology in Schizophrenia. <i>Silverstein, A., and Kline, N. S.</i>	389
The Syndrome of Apractognosia due to Lesions of the Minor Cerebral Hemisphere. <i>Hécaen, H., et al.</i>	400

Pharmacotherapeutic Evaluation and the Psychiatric Setting

Data are presented illustrating the effects of chlorpromazine and reserpine prescription to patients at the Institute of Psychosomatic and Psychiatric Research and Training of the Michael Reese Hospital. The results have been less positive than most studies reported elsewhere. An attempt is made to analyze factors in the specific psychiatric setting and patient population that might account for these findings. One factor appeared to be the relatively negative attitude of our hospital personnel toward the prescription of drugs as compared with alternative modes of therapy. This attitude seemed to be the antithesis of enthusiasm regarding drug effects seen elsewhere. "Double-blind" studies of drug effects do not entirely preclude the communication of such attitudes, especially when "active drugs" are compared with relatively inert preparations.

The author concludes that the social context within which pharmacotherapy is undertaken has importance in the over-all evaluation of therapeutic effect. It appeared as relevant as the specific pharmacological action of the drug and the psychodynamic meaning to the patient of receiving the drug. An attempt has been made to explore some of the implications of these conclusions for evaluation of results in other psychiatric therapies.

(Authors' Abstr.)

Neurophysiologic Effects of Electrically Induced Convulsions

Neurophysiologic studies, utilizing a modified spectrochemical technique for following the distribution of cocaine used as a tracer agent, have been performed on cats under control conditions and after a series of electroshocks. The object of these experiments was to determine whether or not alterations in the concentration of cocaine occurred in the central nervous system after a series of electrically induced convulsions. Significant and relatively persistent rises in the concentration of cocaine were found in the cerebral cortex after repeated electroshocks which induced convulsions. Since no change was observed in the concentration of

cocaine in the blood of these same animals after electroshock, it was concluded that a series of electrically induced convulsions increased the permeability of the blood-brain barrier.

Gross changes in the electroencephalogram were observed to accompany the persistent change in the permeability, suggesting that cerebrovascular permeability may be important in the neurophysiologic conditioning of the brain.

The concept of cerebral neurophysiologic conditioning secondary to cerebrovascular permeability changes is discussed as possibly offering an explanation for persistent effects which might correlate with the clinical benefits of electroshock therapy. A review of the numerous other studies on electroshock therapy failed to show persistent neurophysiologic changes which could be correlated satisfactorily with the clinical effects of this form of therapy. The concept of cerebrovascular permeability is attractive in that (a) it involves a basic neurophysiologic mechanism capable of conditioning the neurophysiology of the central nervous system; (b) as demonstrated in the present study, this mechanism may be modified over relatively prolonged periods by electrically induced convulsions and hence might produce neurophysiologic effects that could be correlated with the somewhat sustained clinical benefits of electroshock therapy; and (c) although neurophysiologic processes, directly or primarily involving neuronal elements and pathways, could scarcely be expected from what is known of them to produce persistent effects, the mechanism considered has the advantage of offering an explanation for a sustained conditioning of these elements without itself being dependent upon them.

This thesis, however, cannot be accepted without further correlative studies, as indicated. (Authors' Abstr.)

Autonomic Pharmacology in Schizophrenia

In an attempt to elicit differences between the functioning of the autonomic nervous systems in schizophrenics and in nonschizophrenics, small, carefully selected samples from each group were subjected to several pharmacodynamic investigations. Both a sympathomimetic agent (synthetic 1-epinephrine) and a parasympathomimetic one (methacholine (Mechoyl)) were employed alone, and together with their respective blocking agents (phentolamine (Regitine) and atropine). The sympatholytic (phentolamine) and parasympatholytic (atropine) agents were then employed independently. Advantage was also taken of the nicotinic action of carbachol in atropinized subjects to produce pharmacologically induced sympathetic discharges.

The rationale for using pharmacological agents to study autonomic physiology is stated; the literature on the use of autonomic drugs in schizophrenics is reviewed, and an attempt is made to explain some of the reported conflicting results of previous investigators.

The results of the present study are not striking. The diminished reactivity of schizophrenics to injected epinephrine described by a majority of authors and the results of Hoffer's atropine test could not be confirmed. A definite tendency toward differences between the responses of diastolic pressure of the schizophrenic and the nonschizophrenic groups to phentolamine was elicited, and a possible tendency toward differences between the groups as a result of the pharmacologically induced sympathetic discharge was noted. As several previous studies have shown, the schizophrenic reaction is characterized by greater variability and slower homeostatic mechanisms than is that of the control group.

The literature indicating the importance of the autonomic nervous system (with emphasis on its pharmacodynamic aspects) in many of the current biological-psychiatric studies of schizophrenia is reviewed. The usefulness of pharmacological methods of study is restated, and plans for further investigation are presented.

(Authors' Abstr.)

MAY

- *An Objective Test which Differentiates Between Neurotic and Psychotic Depression. *Shagass, C., et al.* 461
- *The "Protein Profile" in Disorders of the Central Nervous System. *Volk, B. W., et al.* 472
- *LSD in Patients with Excess Serotonin. *Sjoerdsma, A., et al.* 488
- Death Following ECT. *Gaitz, C. M., et al.* 493
- *Comparison of Chlorpromazine and Reserpine in Treatment of Schizophrenia. *Kurland, A. A.* 500
- *Parkinsonian Reactions Following Chlorpromazine and Reserpine. *May, R. H., and Voegelé, G. E.* 522
- *Scalp and Basal EEG During the Effect of Reserpine. *Arellano, Z. A. P., and Jeri, R.* 525
- *Anxiety and Cerebral Excitability. *Jeanes, R. F., and Toman, J. E. P.* 534
- *Experimental Subcortical Epilepsy. *Faeth, W. H., et al.* 548

An Objective Test which Differentiates Between Neurotic and Psychotic Depression

The sedation threshold is an objective determination based upon the EEG and speech changes induced by intravenous amobarbital sodium. The main purpose of this study was to apply this test to the study of depressive states, particularly to the problem of distinguishing between neurotic and psychotic depression. Additional purposes were to obtain data concern-

ing (a) neurophysiological differences between anxiety and depression and (b) the relationship between the sedation threshold and the effects of electroconvulsive therapy (E.C.T.).

Sedation thresholds were determined for 182 patients in the following diagnostic categories: psychotic depression, schizoaffective psychosis with depression, "hysterical" depression, neurotic depression, and anxiety state.

Results were as follows: (a) Sedation thresholds of patients with neurotic and psychotic depressions were markedly different; the test differentiated between these groups with about 95 per cent. accuracy. Age difference was not an influential factor. Thresholds were low in psychotic depression, regardless of the degree of agitation or history of previous depressive episodes. (b) The thresholds of patients with anxiety states were similar to those of patients with neurotic depressions and almost always higher than those of patients with psychotic depressions. (c) Patients with high sedation thresholds (neurotic depressions and anxiety states) were treated with (E.C.T.) much less frequently than patients with low sedation thresholds (psychotic and "hysterical" depressions). When (E.C.T.) was given, the short-term therapeutic response of the high-threshold patients was significantly poorer than that of the low-threshold group. (d) The sedation thresholds of psychotic depressive patients who had received (E.C.T.) prior to testing were higher than those of patients not recently receiving such treatment.

The following conclusions were reached: (a) The sedation threshold appears to be a valid objective method for the differential diagnosis of depressive states. (b) The results supported the validity of the concept which distinguishes between neurotic and psychotic depressions. (c) The relationship between the sedation threshold and depression was probably secondary to the effect of another factor, degree of impairment of ego functioning, on the threshold. (d) The sedation threshold appears to have some validity for predicting the outcome of E.C.T. (Authors' Abstr.)

The "Protein Profile" in Disorders of the Central Nervous System

The protein fractions in serum and cerebrospinal fluid (C.S.F.) of 115 patients with neurological diseases, other than typical multiple sclerosis (M.S.), and of 9 debilitated patients with non-neurological disorders were studied.

The neurological cases, for statistical purposes, were classified according to their predominant pathologic lesion, as far as this could be estimated clinically, into five groups. This classification was based on whether the disease was clinically stationary or whether it was suggestive of progression with respect to destruction of myelinated structures and/or nerve cells.

The combined protein changes, termed the "protein profile", were compared by means of group statistics with those of a group of patients with typical multiple sclerosis and with those for a group of normal subjects.

The results demonstrate that the chemical (C.S.F.) protein values, confined to γ -globulin and total protein (T.P.) determinations, differ from those for typical multiple sclerosis in a large spectrum of neurological disorders, which includes cerebral palsy, Parkinsonism, amyotrophic lateral sclerosis, syringomyelia, familial and nonfamilial degenerative diseases of the central nervous system, atypical multiple sclerosis, posterolateral degeneration with pernicious anemia, Schilder's disease, primary lateral sclerosis, residual paralytic poliomyelitis, etc.

There was considerable overlapping in the ranges of the electrophoretic serum protein fractions in all the groups of neurological patients with multiple sclerosis except for cases with evidence of stationary cell loss, such as patients with residuals of paralytic poliomyelitis and cerebral palsy, as well as for a group which included patients with posterolateral degeneration with pernicious anemia, Schilder's disease, and posterolateral sclerosis of unknown etiology. Only the series of patients with hemiplegia showed an overlapping of the protein profile with that for typical multiple sclerosis, regardless of the duration of the disease.

A control group of debilitated patients, with and without neurological disorders, displayed overlapping serum protein findings with the (M.S.) group, although the mean values for albumin and γ -globulins were significantly below those usually observed in normal subjects or in (M.S.) patients, and the (C.S.F.) findings fell into the normal range. This group of patients was included in this work in order to study the influence of the nutritional status on the protein profile.

No theories are offered to explain the changes of the protein profile in neurological disorders. However, it appears certain that the demyelinating progress per se does not determine these changes, since such conditions as Schilder's disease and posterolateral degeneration with pernicious anemia display a normal protein profile.

(Authors' Abstr.)

Lysergic Acid Diethylamide in Patients with Excess Serotonin

The effects of lysergic acid diethylamide (LSD) were studied in two patients whose blood serotonin levels were elevated as the result of malignant carcinoid. The psychological changes produced by (LSD) in these patients are of the order which have been observed in normal subjects receiving (LSD). It is concluded that elevation of blood serotonin levels does not alter the central effects of (LSD).

(Authors' Abstr.)

Comparison of Chlorpromazine and Reserpine in Treatment of Schizophrenia

In a comparison of the data reported in the literature and in a comparative study of 200 chronic schizophrenic women patients treated with chlorpromazine and 200 chronic schizophrenic women patients treated with reserpine in the same hospital setting by the same personnel, there appeared to be a better clinical response with chlorpromazine.

(Author's Abstr.)

Parkinsonian Reactions Following Chlorpromazine and Reserpine

Four cases are reported in which a Parkinsonian syndrome developed during chlorpromazine administration and also under reserpine medication, each drug given singly. The hypothesis is offered that one or more identical areas in the central nervous system are affected by direct or referred action of either drug.

(Authors' Abstr.)

Scalp and Basal Electroencephalogram During the Effect of Reserpine

An electroencephalographic investigation was made in eight patients under reserpine therapy using scalp and basal leads (two nasopharyngeal and two tympanic electrodes). One of the cases was a normal subject, and two had manic-depressive psychoses with normal electroencephalograms. The remaining five patients were selected according to a definite abnormal brain wave pattern. Two had petit mal; one, grand mal; one had psychomotor seizures, and one was a "rhinencephalic psychosomatic" case.

Under reserpine the basal electroencephalogram showed slow waves of 2.5 c.p.s. and slow theta rhythm in some patients, whereas the scalp electroencephalogram did not show any striking change. In some epilepsy was aggravated with reserpine but improved on anti-convulsants in reduced doses. In the psychosomatic case reserpine behaved as a drug stimulating "dream phantasies".

Some neurophysiological considerations are made on the probable action of reserpine, assuming that it may produce its effect through the Papez neurophysiological circuits.

From this small series the authors are not able to make any definite conclusion. Nevertheless, they can say preliminarily that reserpine seems to produce slow waves and slow theta rhythm in the basal electroencephalogram, with the technique and the doses they used.

(Authors' Abstr.)

Anxiety and Cerebral Excitability

Latency from shock to onset of tonic seizure in patients undergoing E.S.T. is introduced as a simple measure of cerebral excitability when shock is maintained constant.

Seizure latency is highly correlated with level of clinical anxiety immediately preceding E.S.T., greater anxiety giving longer latency. The effect is predominantly determined by change in threshold.

Older patients show significantly longer latency.

Latency tends to increase progressively with continued E.S.T. treatments.

Latency is longer in women than in men, the difference apparently depending on some factor other than threshold.

Depressive and schizoid daily ratings show negligible relation to latency. However, depressed patients as a group show longer latency than schizoaffective patients.

Room temperature and humidity within ordinary limits show poor correlation with latency.

Although latency is primarily affected by anxiety level, the latter shows no consistent progressive change with E.S.T.

The day-to-day "spontaneous" fluctuations in latency and threshold due to level of anxiety correspond to approximately a 20 per cent. variation in stimulus energy.

Correlation is negligible between psychiatric ratings of anxiety, depression, and schizoaffective dissociation.

Both schizoaffective and depressed patients obtain maximum immediate benefit in the first five E.S.T. treatments.

Subsequent treatments produce increasing schizoid dissociation both in schizoaffective and in depressed patients, but particularly in the former.

The cerebral inhibitory function of anxiety and its possible neural mechanisms are discussed.

A theory of initiation of seizures involving an initial inhibitory latent phase is presented.

Parallel animal experiments demonstrate that stress increases latency.

The simplicity and value of a noninterfering latency measurement and psychiatric interview procedure for regulating E.S.T. therapy is emphasized.

(Authors' Abstr.)

Experimental Subcortical Epilepsy

A total of 82 subcortical injections of procaine penicillin G in oil (0.03 c.c.-10,000 units) were made in 25 monkeys. These injections produced 35 spontaneous seizures—an additional 2 were induced with pentylenetetrazol (Metrazol). Electroencephalographic abnormalities followed the injection in 56 animals.

The seizures produced consisted mainly of contralateral focal motor attacks, adverse seizures, and psychomotor attacks.

The EEG concomitants of these attacks consisted principally of an intermittent or continuous focal spiking discharge over the central and, less frequently, the temporal cortex. There were, however, a variety of abnormalities, ranging from localized high-voltage sharp waves to generalized slow-frequency waves.

The lesions were located in most of the basal ganglia, and little specificity for particular seizure patterns for any given structure was noted.

The clinical attacks and EEG abnormalities were largely indistinguishable from those commonly attributed to seizures of cortical origin.

(Authors' Abstr.)

VOL. 16	ARCH. PSICOL. NEUR. PSICHIAT.	1955
A Contribution to the Study of Visual Recognition. <i>Cesa-Bianchi, M.</i>	.. .. .	531
A Contribution to the Clinical Study of Parietal Arterio-venous Angiomas. <i>Guareschi, A., and Magri, B.</i>	.. .. .	545
A Contribution to the Study of "Dermatozoic Delirium". <i>Zambianchi, A.</i>	.. .. .	580

VOL. 17		1956
Considerations on the Study of the Psychology of Modern Italian Youth. <i>Busnelli, C.</i>	.. .. .	3
A Contribution to the Dynamic Psychotherapy of the Neuroses. <i>Marzuoli, V.</i>	.. .. .	19
The Different Judgments of Medico-legal Surveyors on the Matter of Legal Responsibility. <i>Franchini, A.</i>	.. .. .	33
Contribution to the Study of Phenomenological Experiences with LSD 25. <i>Callieri, B., and Ravetta, M.</i>	.. .. .	43

VOL. 52	BR. J. ADDICT.	OCTOBER, 1956
The Modern Treatment of Alcoholism. <i>Feldmann, H.</i>	.. .. .	7
Laevulose, Apomorphine and Oxygen in the Treatment of Alcohol Addiction. <i>Pruitt, M.</i>	.. .. .	39
The Nutritional Aspect of Chronic Alcoholism. <i>Heller, H.</i>	.. .. .	45
A Treatment Centre for Alcoholics. <i>Glatt, M. M.</i>	.. .. .	53
The Problem of Alcoholism in France. <i>Watson, C.</i>	.. .. .	99

VOL. 6	BR. J. DELINQ.	APRIL, 1956
Violent Cruelty to Children. <i>Gibbens, T. C. N., and Walker, A.</i>	.. .. .	260
Staff Strain in Institutions. <i>de Berker, P.</i>	.. .. .	278
Sociometric Analysis and Observation in a Borstal Institution. <i>Rose, G.</i>	.. .. .	285

VOL. 29	BR. J. MED. PSYCHOL.	MARCH, 1956
Symposium on Jung's Contribution to Analytical Thought and Practice. <i>Fordham, M., Moody, R., and Plant, A.</i>	.. .. .	3
The Significance of Jean Piaget for Child Psychiatry. <i>Anthony, E. J.</i>	.. .. .	20
Speech-breathing Activity and Content in Psychiatric Interviews. <i>Goldman-Eisler, F.</i>	.. .. .	35
Personality as a Factor in the Pathogenesis of Cancer. <i>Lesham, L. L., and Worthington, R. E.</i>	.. .. .	49
The Application of the Therapeutic Community Principle to a State Mental Health Programme. <i>Jones, M., and Matthews, R. A.</i>	.. .. .	57
Demonstration of a Psychosomatic Relationship. <i>Metcalfe, M.</i>	.. .. .	63

VOL. 47	BR. J. PSYCHOL.	FEBRUARY, 1956
Methodology of Trait Analysis. <i>Stephenson, W.</i>	.. .. .	5
Some Characteristics of Good Judges of Others. <i>Taft, R.</i>	.. .. .	19
Towards an Information-flow Model of Human Behaviour. <i>MacKay, D. M.</i>	.. .. .	30
Is Consciousness a Brain Process? <i>Place, U. T.</i>	.. .. .	44
Listening Between and During Practised Auditory Distractions. <i>Broadbent, D. E.</i>	.. .. .	51
Mind Wandering. <i>Cohen, J., et al.</i>	.. .. .	61
The Influence of Mental Set on Problem-Solving. <i>Hunter, I. M. L.</i>	.. .. .	63

MAY

Changing Scene. <i>Bartlett, F. C.</i>	.. .. .	81
The Boundaries Between the Person and the World. <i>Murphy, G.</i>	.. .. .	88
The Principle of Individuation and the Co-ordinates of Conduct. <i>Raven, J. G.</i>	.. .. .	95
Use of the EEG in the Study of Imagery. <i>Barratt, P. E.</i>	.. .. .	101
A Theory of Insight Reasoning and Latent Learning. <i>Deutsch, J. A.</i>	.. .. .	115
Sex Differences in Preferences for Shapes. <i>Jahoda, G.</i>	.. .. .	126
A Note on the Scale Product and Related Methods of Scoring Attitude Scales. <i>Butcher, H. J.</i>	.. .. .	133

The Effect of Stimulus Light Intensity on Reaction Time of Schizophrenics. <i>Venables, P. H., and Tizard, J.</i>	144
---	-----

VOL. 79	BRAIN	MARCH, 1956
----------------	--------------	--------------------

Verbal Realization in Aphasia. <i>Alajouanine, T.</i>	1
The Structure of Emotions Reflected in Epileptic Experiences. <i>Williams, D.</i>	29
Unilateral "Spatial Agnosia". <i>Battersby, W. S., et al.</i>	68
The Defect of Function in Visual Agnosia. <i>Macrae, D., and Trolle, E.</i>	94
Dissecting Aortic Aneurysm with Infarction of the Spinal Cord. <i>Thompson, G. B.</i>	111
The Relationship Between Neurohistology and Corneal Sensibility. <i>Lele, P. P., and Weddel, G.</i>	119
Observations on the Mammalian Reflex Prototype of the Sign of Babinski. <i>Hoff, H. E., and Breckenridge, C. G.</i>	155
Cerebral Representation. <i>Gooddy, W.</i>	167
The Names of the Parts of the Body. <i>Wright, G. H.</i>	188

VOL. 21	BULL. LOS. ANGELES NEUR. SOC.	MARCH, 1956
----------------	--------------------------------------	--------------------

The Process of Demyelination in the Central Nervous System. <i>Courville, C. B.</i>	1
The Necropsy Incidence of Glioblastoma Multiforme. <i>Marsh, J. S.</i>	27
Supratentorial Glioblastoma Multiforme in Infancy. <i>Marsh, J. S.</i>	30
The Electromyogram in the Diagnosis of Infectious Neuritis. <i>Marinacci, A. A., and Rand, C. W.</i>	37

VOL. 32	CERVELLO	1956
----------------	-----------------	-------------

Considerations on the Histopathological Picture in Some Cases of Idiocy. <i>Fattovich, G.</i>	1
Serotonin Activity of the Central Nervous System. <i>Poloni, A.</i>	36
Lesions of the Liver Cells Produced by the Local Application of Chlorpromazine. <i>Maria, G.</i>	41
Statistical Data and Clinical Considerations of Recovery from Alcoholism. <i>Miglio, G.</i>	50
EEG Research in "Pavor Nocturnus". <i>Maria, G.</i>	102
Collective Psychoses. <i>Sagripanti, P.</i>	113
Modifications of the Activity of Serotonin, etc. <i>Poloni, A.</i>	123
Psychasthenia and Criminality. <i>Cascella, G.</i>	132

VOL. 15	CONF. NEUROL.	1955
----------------	----------------------	-------------

The Site of Action of Antiparkinson Drugs. <i>Rinaldi, F., and Himwich, H. E.</i>	209
Effects of Experimentally Induced Psychoses on Artistic Expression. <i>Tonini, G., and Montanari, C.</i>	225
The Histopathological Classification of Tumours of the Optic Nerve. <i>Gramberg-Danielsen, B.</i>	240
Quick's Hippuric Acid Test in Acute and Chronic Schizophrenics. <i>Müller, H. R.</i>	250
An Investigation into the Possible Infective Etiology of Multiple Sclerosis. <i>Dekanban, A. S.</i>	271
Studies on the Physiology of Awareness. <i>Lovett-Doust, J. W., and Callagan, J. E.</i>	298
The Spinal Course of the Corticofugal Fibers Arising in the Motor Cortex of the Cat. <i>Chiavngi, E., et al.</i>	304
Simple and Choice Reaction Time in Cerebral Disease. <i>Blackburn, H. L., and Benton, A. L.</i>	327
Encephalomyelitis due to Atypical Pneumonia. <i>Bornstein, B., and Efrati, P.</i>	339
Cerebral Potentials in Stuttering and Muttering. <i>Streifler, M., and Gumpertz, F.</i>	344
The Physiopathology of Cataplexy. <i>von Fuster de Carulla, J.</i>	360

VOL. 17	DIS. NERV. SYST.	APRIL, 1956
----------------	-------------------------	--------------------

Path for Projection of Non-specific Diffuse Impulses to Cortex for EEG, Related to Consciousness. <i>Papez, J. W.</i>	103
Prospects in Psychopharmacology. <i>Himwich, H. E.</i>	109
Effects of Partial Perceptual Isolation in Mentally Disturbed Individuals. <i>Azima, H., and Cramer, F. J.</i>	117
Prevention of Protracted Insulin Coma by Carbon Dioxide and Oxygen. <i>Litteral, E. B., et al.</i>	123
Factor of Aggression as Related to the EEG. <i>Kennard, M. A., et al.</i>	127
*The Grantham Lobotomy for the Relief of Neurotic Suffering. <i>Ayd, F. J.</i>	132
Experimental Catatonia in Animals and Induced Catatonic Stupor in Man. <i>Holland de Jong, H.</i>	135

The Grantham Lobotomy for the Relief of Neurotic Suffering

Thirty chronic neurotic and psychotic patients in whom neurotic suffering was paramount have been treated by the Grantham lobotomy. Pre-operatively, these patients had been

refractory to the usual methods of psychiatric treatment. The Grantham operation produced marked improvement in 18 patients, moderate improvement in six, and slight improvement in two. Four were unimproved.

This paper covers the selection of patients, the post-operative course, and the advantages of this psychosurgical procedure. It indicates that the Grantham lobotomy is a tremendous step forward in the treatment of neurotic suffering.

(Author's Abstr.)

MAY

Psychotherapy of Ulcerative Colitis. <i>Clark, L. D.</i>	149
*Peganone, a New Antiepileptic Drug. <i>Schwade, E. D., et al.</i>	155
*Relation of Chlorpromazine to Epilepsy. <i>Meszaros, A. F., and O'Reilly, P. O.</i>	159
Raynaud's Disease Studied by Hypnosis. <i>Norris, A., and Huston, P.</i>	163
Psychosis Associated with Child Bearing. <i>Combs, J.</i>	166
Observations on Convulsive and Sub-convulsive ECT During Intravenous Anesthesia. <i>Olsen, C. W.</i>	169

Peganone, a New Antiepileptic Drug

1. Peganone is an effective drug in the control of epileptic seizures.
2. It is most effective against grand mal. In combination with other anticonvulsants it is useful in the control of psychomotor attacks and is of considerable benefit in the difficult variants.
3. The effective daily dose of Peganone is 2 to 3 grams for adults. In children, 0.5 to 1 gram is used.
4. A notable feature of Peganone is the low incidence of side effect, less than any anticonvulsant in the authors' experience. No serious toxicity has been seen. Of particular interest, since Peganone is a hydantoin, is the absence of gum hyperplasia and ataxia.
5. Peganone combines well with other antiepileptic drugs and such combinations often result in control of seizures with no additional side effects. However, if combined with Phenurone it must be used with caution.
6. Because of its effectiveness, synergism with other anticonvulsants, and exceptionally low incidence of side effects, Peganone is, in the authors' experience, a valuable addition to the antiepileptic armamentarium and further clinical evaluation is warranted.

(Authors' Abstr.)

Relation of Chlorpromazine to Epilepsy

1. A brief survey of literature is presented regarding the toxic, epileptogenic properties of chlorpromazine and its effectiveness in the treatment of epileptic disorders.
2. In a group of hospitalized, disturbed epileptic patients a significant improvement in behavior was achieved with the use of chlorpromazine.
3. Occasionally a transient increase in seizure activity occurred under chlorpromazine treatment.
4. Chlorpromazine appears to potentiate the effect of anticonvulsant drugs. This potentiating effect is seldom immediate; there is a critical stage with danger of seizures during the change in medication. The advisable procedure is to continue the previous medication for a while after chlorpromazine is added. If patient remains free of seizures, the dosage of anticonvulsants may be reduced.
5. Although in itself not anticonvulsant and occasionally seizure precipitating, chlorpromazine is valuable in the treatment of epilepsy, particularly if the condition is accompanied by a severe disorder of behavior.

(Authors' Abstr.)

JUNE

Therapy of Acute Porphyria with BAL and Other Agents. <i>Peters, H. A.</i>	177
Psychiatric Horizons and Internal Medicine. <i>McLoughlin, C. J.</i>	184
A Review of the Newer Drug Therapies in Psychiatry. <i>Kinross-Wright, V.</i>	187
Concept of Assurance of Illness Reversibility. <i>Schneck, J. M.</i>	191
*The Effect of LSD on <i>Betta splendens</i> . <i>Turner, W. J.</i>	193 and 198

The Effect of Lysergic Acid Diethylamide on Betta splendens. I

The action of 60 pharmacologic agents has been examined on 22 species of fresh water fish. LSD-25 has a special action on *Betta splendens* which is not found in the other species. This action is partly shared by LAE-32 but not by serotonin, bufotenine, mescaline or adrenochrome. It is potentiated by hyoscyne and counteracted by pilocarpine.

(Author's Abstr.)

Space and Time in the Central Nervous System. <i>Davis, H.</i>	185
Visual Imagery and EEG Changes. <i>Walter, R. D., and Yeager, C. L.</i>	193

Electrographic Studies of the Formation of Temporary Connections in the Brain. <i>Morrell, F., and Jasper, H. H.</i>	201
Effect of Focal Epileptogenic Lesions and their Ablation upon Conditioned Electrical Responses of the Brain in the Monkey. <i>Morrell, F., et al.</i>	217
Effect of Electrocortical Arousal upon Development and Configuration of Specific Evoked Potentials. <i>Gauthier, C., et al.</i>	237
*Electrophysiological Studies of Hippocampal Connections and Excitability. <i>Green, J. D., and Adey, W. R.</i>	245
*EEG Rhythms from the Depths of the Parietal, Occipital and Temporal Lobes in Man. <i>Sem-Jacobsen, C. W., et al.</i>	263
EEG Activation with Chloralson. <i>Monroe, R. R., et al.</i>	279
An EEG Examination of the Effects of Megimide and Daptazole in Barbiturate Narcosis. <i>Peacock, J. M.</i>	289
EEG Findings Following Intravenous Injection of Benadryl. <i>Diaz-Guerrero, R., et al.</i>	299
Experimental Seizures in Man and Animals with Acute Pyridoxine Deficiency Produced by Hydrazides. <i>Pfeiffer, C. C., et al.</i>	307
Sleep as General Activation Procedure in EEG. <i>Silverman, D.</i>	317

Electrophysiological Studies of Hippocampal Connections and Excitability

1. An electrophysiological study of the afferent and efferent pathways of the hippocampus has been made.
2. The excitability of the hippocampus has been studied before and after isolation from the rest of the brain.
3. Evidence for afferent projections to the hippocampus through the fornix has been adduced.
4. Evidence that the dentate gyrus may present an intermediary relay station is advanced.
5. Evidence is presented for connections between the hippocampus and various cortical and subcortical areas, including limbic cortex, amygdala, diencephalic areas and the mid-brain tegmentum.
6. The physiological role of the hippocampus and its significance in seizure discharge are discussed.

(Authors' Abstr.)

Electroencephalographic Rhythms from the Depths of the Parietal, Occipital and Temporal Lobes in Man

Further studies have been done in an effort to establish additional patterns of the electric activity in the depths of the human brain. It has been demonstrated that somatic, sensory, motor, auditory and visual activity can be recorded from the depths of the brain.

Synchronous activity recorded from the ventromedial part of the frontal lobe, parts of the temporal lobe, parts of the parietal lobe and the region of the hypothalamus indicates connections between these regions.

Profound changes in the electric activity in these regions during acute episodes of agitation and hallucination have been observed.

(Authors' Abstr.)

VOL. 44	ENCEPH.	1955
Subacute Sclerosing Leucoencephalitis with an Important Hallucinatory Syndrome. <i>Geets, W., and van Bogaert, L.</i>	405	
Congenital Generalized Analgesia. <i>Ortiz de Zarate, J. C.</i>	414	
The Psycho-somatic Aspect of Hemorrhagic Recto-colitis. <i>Cain, J., et al.</i>	427	
Similarity of Histological Lesions of Cerebellar Hypogenesis of the Cat to those of Some Intoxications. <i>Valade, P.</i>	447	
The Differential Diagnosis of Pick and Alzheimer's Diseases from Twelve Anato- mical Observations. <i>Delay, J., et al.</i>	454	
Some Observations Relative to the Idea of Body Awareness. <i>Critchley, M.</i>	501	
The Intimate Journal of a Confused Person. <i>Delay, J., et al.</i>	532	

VOL. 27	EVOL. PSYCHIAT.	JULY-SEPTEMBER, 1955
Psychomotor Activities. <i>Minkowski, E.</i>		413
Symposium on Depressive States. <i>Rouart, J., et al.</i>		459

VOL. 58	FOL. PSYCHIAT. NEUR. NEUROCHIR. NEERL.	1955
A Clinic for Puberty-psychoses. <i>van der Horst, L.</i>	391	
A Psychoanalytical Approach to Adolescence and Juvenile Neuroses. <i>Hart de Ruyter, T.</i>	408	
Alzheimer's Disease. <i>Schenk, V. W. D.</i>	422	
Inclusion Body Encephalitis. <i>Tans, J., and Wijers, H.</i>	438	
Psychological Considerations on Continuous Sleep-treatment. <i>Poslavsky, A.</i>	482	

VOL. 83	GIORN. PSICHIAT. NEUROPAT.	1955
Considerations on the Problem of Artificial Sleep in Psychiatry. <i>Puca, A., and Cattapano, V. D.</i>		739
A Contribution to the Study of Ocular Movements in Visual Representation. <i>Cesabianchi, M.</i>		749
Statistical Study of the Contents of the Rorschach Test in Children Between 7-11. <i>Cotte, S.</i>		781
Syndrome of Endocranial Hypertension during a Chronic Pulmonary Emphysema. <i>Rossini, R., and Lugaresi, E.</i>		795
Periarthritis Nodosa. <i>Gentili, G. C., and Lugaresi, E.</i>		805
The Evolution of Tetanic Intoxication in Accordance with Speransky's Pathogenic Theory. <i>Carrieri, G.</i>		863
Catamnestic Examinations on Childhood and Youth of Schizophrenics. <i>Andreani, G.</i>		884
The Syndrome of Laurence-Moon-Biedl-Bardet. <i>Ruggeri, R., et al.</i>		913
Psychopathological Observations on a Case of Tumour of the Anterior Cranial Fossa. <i>Missaglia, A.</i>		935
Serotonin and Perspiration. <i>Morsiani, M., and Martelli, G.</i>		951

VOL. 53	GENET. PSYCHOL. MONOGR.	MAY, 1956
Stress, Fantasy and Schizophrenia. <i>Kerner, O. J. B.</i>		189
The Attitude Structure of the Individual. <i>Kerlinger, F. N.</i>		283

VOL. 37	INTERNAT. J. PSYCHO-ANAL.	1956
Report on my Studies in Paris and Berlin. <i>Freud, S.</i>		2
On the Psychical Mechanism of Hysterical Phenomena. <i>Breuer, J., and Freud, S.</i>		8
On the Teaching of Psycho-analysis in Universities. <i>Freud, S.</i>		14
Memorandum on the Electrical Treatment of War Neurotics. <i>Freud, S.</i>		16
A Chronological Hand-list of Freud's Works. <i>Tyson, A., and Strachey, J.</i>		19
The Inception of Totem and Taboo. <i>Jones, E.</i>		34
Character and Neurosis. <i>Nunberg, H.</i>		36
Phylogenetic vs. Ontogenetic Experience. <i>Fliess, R.</i>		46
The Schreber Case. <i>Baumeyer, F.</i>		61
Freud's Repression Concept. <i>Madison, P.</i>		75
Freud's Writings on Art. <i>Fraiberg, L.</i>		82
Dream and Vision. <i>Rosenfeld, E. M.</i>		97
Freud and the Future. <i>Mann, T.</i>		106
Symbolism and its Relationship to the Primary and Secondary Processes. <i>Rycroft, C.</i>		137
Notes on Symbolism. <i>Rodrigu�, E.</i>		147
Symbolic Associations Following Subliminal Stimulation. <i>Dixon, N. F.</i>		159
The Vocational Hazards of Psycho-analysis. <i>Wheeler, A.</i>		171
Psycho-analysis Reflections on the Development of Ball Games, Particularly Cricket. <i>Stokes, A.</i>		185

	INTERNAT. REV. CRIM. POLICY	JANUARY, 1956
The Treatment of Juvenile Delinquents in Australia and New Zealand		1
Juvenile Delinquency Seen as a Problem of Work		25
The Educational Aspects of Juvenile Delinquency		55
Problems in the Process of Industrialization, Urbanization and Social Disorganization		71
The Detection of the "Pre-delinquent" Juvenile		74

VOL. 51	J. AB. SOC. PSYCHOL.	NOVEMBER, 1955
Social Interaction and the Self Concept. <i>Manis, M.</i>		362
Formation of New Associations to Words Selected on the Basis of Reaction-Time-G.S.R. Combinations. <i>Jacobs, A.</i>		371
Emergent Leadership in Small, Decision-Making Groups. <i>Crockett, W. H.</i>		378
Influence of Cognitive and Affective Factors in Learning and Retaining Attitudinal Materials. <i>Garber, R. B.</i>		384
Conformity to Groups as a Function of Group Success. <i>Kidd, J. S., and Campbell, D. T.</i>		390
Analysis of Social Interaction. <i>Borgatta, E. F.</i>		394
Mechanisms of Group Psychotherapy. <i>Corsini, R. J., and Rosenberg, B.</i>		406
Some Effects at Maturity of Gentling, Ignoring or Shocking Rats During Infancy. <i>Scott, J. H.</i>		412
Some Personality and Intellectual Correlates of Intolerance of Ambiguity. <i>Davids, A.</i>		415
The Changing Family Relationships of Adolescent Girls. <i>Liccione, J. V.</i>		421
Psychosexual Conflicts and Defenses in Visual Perception. <i>Nelson, S. E.</i>		427
Self-predictive Orientation and the Movement Interpretation of Threat. <i>Landfield, A. W.</i>		434
Reaction of Middle and Lower Class Children to Finger Paints as a Function of Class Differences in Child-Training Practices. <i>Alper, T. G., et al.</i>		439
Response to Personality Inventories with Situation Stress. <i>Jacobs, A., and Leventer, S.</i>		449

Leadership and Popularity as a Function of Behavioral Predictions. <i>Trapp, E. P.</i> ..	452
Some Effects of Experimentally Induced Anxiety upon Discrimination Behavior. <i>Eriksen, C. W., and Wechsler, H.</i> ..	458
Reaction to Stress. <i>Korobow, N.</i> ..	464
Do Intercultural Experiences Affect Attitudes? <i>Smith, H. P.</i> ..	469
The Disposition Toward Originality. <i>Barron, F.</i> ..	478
The Anal Character and Political Aggression. <i>Farber, M. L.</i> ..	486
Attributed Social Power and Group Acceptance. <i>Zander, A., and Cohen, A. R.</i> ..	490
The Influence of Simulated Mutilation upon the Perception of the Human Figure. <i>Wittreich, W. J., and Radcliffe, K. B., jun.</i> ..	493
Anxiety and the Conditioning of Verbal Behavior. <i>Taffel, C.</i> ..	496
Dependence on External Influence. <i>Linton, H. B.</i> ..	502
Empirical Elaboration of the Theory of Complementary Needs in Male Selection. <i>Winch, R. F., et al.</i> ..	508
Factors Descriptive of Psychiatric Outpatients. <i>Lorr, M., and Rubinstein, E. A.</i> ..	514
Value Scales and Dimensions. <i>Morris, C., and Jones, L. V.</i> ..	523
Distortions in the Gradient of Stimulus Generalization Related to Cortical Brain Damage and Schizophrenia. <i>Mednick, S. A.</i> ..	536
Serial Learning and Conditioning Under Real-Life Stress. <i>Beam, J. C.</i> ..	543
Interaction Process Analysis of the Mediation of Labour-Management Disputes. <i>Landsberger, H. A.</i> ..	552
Opinion Organization in a Heterogenous Adult Population. <i>Williams, R. J., and Wright, C. R.</i> ..	559
The Effects of Two Experimental Counselling Techniques on Performances Impaired by Induced Stress. <i>Wiener, M.</i> ..	565
Mode of Failure, Interference Tendencies and Achievement Imagery. <i>Williams, J. E.</i> ..	573
Prefrontal Lobotomy as a Means to Improve the Hospital Adjustment of Chronic Psychotic Patients. <i>Newman, J.</i> ..	581
A Demonstration of Bias in Estimates of Negro Ability. <i>Clarke, R. B., and Campbell, D. T.</i> ..	585
A New View of Rigidity. <i>Wolpert, E. A.</i> ..	589
Relation Between Discrimination, Apparatus Stress, and the Taylor Scale. <i>Kamin, L. J.</i> ..	595
Psychoneurosis and Suggestibility. <i>Ingham, J. G.</i> ..	600
A Test of Behavioral Rigidity. <i>Schae, K. W.</i> ..	604
Phenomenal, Ideal and Projected Conceptions of Self. <i>Friedman, I.</i> ..	611
Authoritarianism or Acquiescence. <i>Bass, B. M.</i> ..	616
Understanding Versus Suggestion in the Judgment of Literary Passages. <i>Das, J. P., et al.</i> ..	624
A Study of Normative and Informational Social Influences upon Individual Judgment. <i>Deutsch, M., and Gerard, H. B.</i> ..	629
Sensitization and Prejudice. <i>Marchionine, A. M., and Marcuse, F. L.</i> ..	637
"Authoritarianism" and Authority. <i>Gregory, W. E.</i> ..	641
The Contingency of Humor Appreciation on the Stimulus-Confirmation of Joke-ending Expectations. <i>Kenny, D. T.</i> ..	644
A Direct Laboratory Comparison of Pavlovian Conditioning and Traditional Associative Learning. <i>Razran, G.</i> ..	649
Intellectual Performance as Related to Emotional Instability in Children. <i>Granick, S.</i> ..	653
Comparative Subjective Effects of Seven Drugs Including LSD 25. <i>Jarvik, M.E., et al.</i> ..	657
Anxiety Indices Related to Susceptibility to Persuasion. <i>James, I. L.</i> ..	663
The Control of the Content of Conversation. <i>Verplanck, W. S.</i> ..	668

VOL. 52

JANUARY

1956

Some Factors Affecting the Quality of Therapeutic Relationships. <i>Parloff, M. B.</i> ..	5
Schizophrenic Intellectual Impairment. <i>Binder, A.</i> ..	11
Experimental Effects of Ego-Defense Preference on Interpersonal Relations. <i>Cohen, A. R.</i> ..	19
The Einstelling Test and Performance in Factual Interviewing. <i>Back, K. W.</i> ..	28
Assimilative Projection and Accuracy of Prediction in Interpersonal Perceptions. <i>Lundy, R. M.</i> ..	33
Concept Formation and Impressions of Personality. <i>Gollin, E. S., and Rosenberg, S.</i> ..	39
"Conceptual Level" vs. "Conceptual Area" Analysis of Object-Sorting Behavior of Schizophrenic and Nonpsychiatric Groups. <i>McGaughran, L. S., and Moran, L. J.</i> ..	43
Expectation, Fulfillment and Morale. <i>Spector, A. J.</i> ..	51
The Perception of Social Attitudes. <i>Messick, S. J.</i> ..	57
Member's Reaction to Apparent Group Approval of a Comintern Communication. <i>Kelley, H. H., and Woodruff, C. L.</i> ..	67
Social Sensitivity in the Small Task-Oriented Group. <i>Suchman, J. R.</i> ..	75
The Measurement of Hostility in Clinical Situations. <i>Buss, A. H., et al.</i> ..	84
Perceptual Contact with Reality in Schizophrenia. <i>Lovinger, E.</i> ..	87

Additional Observations on the Social Perception of Authoritarians and Non-authoritarians. <i>Stodel, A., and Freedman, M. L.</i>	92
Physiological Need, Set and Visual Duration Threshold. <i>Taylor, J. A.</i>	96
The Reinforcement of Cooperation Between Children. <i>Azrin, N. H., and Lindsley, O. R.</i>	100
The Effects of an "Anxiety Reducing" Medication on Group Behavior under Threat. <i>Lanzetta, J. T., et al.</i>	103
The Effect of Induced Aggressiveness on Opinion Change. <i>Weiss, W., and Fine, B. J.</i>	109
The Influence of Reinforcement and Punishment in a Minimal Social Situation. <i>Sidowski, J. B., et al.</i>	115
The Experimental Change of a Major Organizational Variable. <i>Morse, N. C., and Reimer, E.</i>	120
Correlates of Two Types of Xenophilic Orientation. <i>Perlmutter, H. V.</i>	130

VOL. 52

MARCH, 1956

Conditioning and Personality. <i>Franks, C. M.</i>	143
Self-appraisal, Personal Desirability and Perceived Social Desirability of Personality Traits. <i>Rosen, E.</i>	157
Discrimination and Reliability in Q-sort Personality Descriptions. <i>Livson, N. H., and Nichols, T. F.</i>	159
The Role of the Small Groups in Mediating the Effects of Propaganda. <i>Brodbeck, M.</i>	166
Self-Ratings of Fear in a Fear-Invoking Situation. <i>Walk, R. D.</i>	171
A Factorial Study of Adjustment to Stress. <i>Holtzman, W. H., and Bitterman, M. E.</i>	179
Motivation and Performance in Schizophrenia. <i>Cohen, B. D.</i>	186
Time and Space Orientation in Schizophrenics. <i>de la Garza, C. O., and Worchel, P.</i>	191
Intra-individual Variability in Sentence Completion Responses. <i>Osterweil, J., and Fiske, D. W.</i>	195
Intertrial Effects of Immediate Self-Committal in a Continuous Social Influence Situation. <i>Fisher, S., et al.</i>	200
Abstract Thinking and Social Behavior in Schizophrenia. <i>Flavill, J. H.</i>	208
Self-consistency as a Factor Affecting Immediate Recall. <i>Cartwright, D. S.</i>	212
Social Status and Success Strivings. <i>Douran, E.</i>	219
An Experimental and Theoretical Analysis of Perceptual Defense. <i>Eriksen, C. W., and Browne, C. T.</i>	224
Object Constancy in Schizophrenia. <i>Raush, H. L.</i>	231
Some Factors Affecting an Individual's Estimate of his Probable Success in a Group Situation. <i>Gerard, H. B.</i>	235
Future Time Perspective in Schizophrenia. <i>Wallace, M.</i>	240
Mother-concepts and Judgments of Young Women's Faces. <i>Secord, P. F., and Jourard, S. M.</i>	246
A Comparison of Reproduction Errors Made by Brain-damaged and Control Patients on a Memory-for-Designs Test. <i>Wahler, H. J.</i>	251
Attitude Change Through Modification of Attitude Structure. <i>Carlson, E. A.</i>	256
The Reliability of Psychiatric Diagnosis. <i>Schmidt, H. O., and Fonda, C. P.</i>	262

VOL. 12

J. CLIN. PSYCHOL.

JANUARY, 1956

Multiple Classification by the Method of Least Squares. <i>Horst, P.</i>	1
Intelligence Test Results and Observations of Personality Disorder among 3,594 Unwed Mothers in Minnesota. <i>Pearson, J. S., and Amacher, P. L.</i>	16
Factors of Importance for Creativity. <i>Drevdahl, J. E.</i>	21
The Objective Rorschach. <i>O'Reilly, P. O.</i>	27
How Important is Psychotherapy to the Hospitalized Psychiatric Patient? <i>Stotsky, B. A.</i>	32
Selection of Abbreviated TAT Sets. <i>Dana, R. H.</i>	36
The Relation Between Certain Parent's Attitudes toward Child Rearing, etc. <i>Bornston, F. L., et al.</i>	41
Two Types of Perceptual Experience. <i>Jenkin, N.</i>	44
A Conversion Table for Relating the MMPI Group and Individual Form Items. <i>Gaston, C. D., et al.</i>	49
Group Psychotherapy in Conjunction with a Physical Treatment. <i>Cowden, R. C., et al.</i>	53
Score Equivalence of the Wechsler-Bellevue Intelligence Scales, Forms I and II. <i>Barry, J. A., et al.</i>	57
Unrealistic Reporting as a Function of Extraverted Neurosis. <i>Keehn, J. D.</i>	61
A Transposed Factor Analysis of a Group of Schizophrenic Patients. <i>Guertin, W. H., et al.</i>	64
Measures of Intelligence in Brain Damaged Children. <i>Gallagher, J. J., et al.</i>	69
A Statistical Study of Freud's Theory of Personality Types. <i>Stagner, R., and Moffitt, J. M.</i>	72
Reliability of the Despert Fables. <i>Peixotto, H. E.</i>	75
The Interdependence of Ratings of Case Histories. <i>Deterline, W. A., and Bendig, A. W.</i>	79
A Bender-Gestalt Diagnostic Validity Study. <i>Bowland, J. A., and Deabler, H. L.</i>	82

Rorschach Card Rejection in Normal and Psychiatric Groups. <i>Sisson, B. D., et al.</i> ..	85
A Comparison of the Ability of Normal and Brain Injured Subjects to Produce Additional Responses on a Second Administration of the Rorschach Test. <i>Weiner, L., and Kaplan, B.</i> ..	89
Galvanic Skin Conductance as a Function of Successive Interviews. <i>Martin, B.</i> ..	91
Manifest Anxiety in Psychotics. <i>Rubin, H., et al.</i> ..	94

APRIL

An Approach to the Improvement of Clinical Psychological Reports. <i>Tallent, N.</i> ..	103
Sources of Ambiguity in Psychological Reports. <i>Cuadra, C. A., and Albaugh, W. P.</i> ..	109
A New Outline for Psychological Report Writing. <i>Thorne, F. C.</i> ..	115
A Methodology for Measuring Personality Changes in Psychotherapy. <i>Leary, T., and Harvey, J. S.</i> ..	123
Study of Therapist Behavior in Diagnostic Interviews by Means of the Interaction Chromograph. <i>Saslow, G., et al.</i> ..	133
Personality Structure and Dynamics of Patients with Rheumatoid Arthritis. <i>Mueller, A. D., and Lefkowitz, A. M.</i> ..	143
The Wechsler-Bellevue Form I and the WAIS. <i>Goolishian, H. A., and Ramsay, R.</i> ..	147
Ranking Methodology. <i>Bendig, A. W.</i> ..	151
An Investigation of the Relationship between Two Measures of Self-Regarding Attitudes. <i>Cowen, E. L.</i> ..	156
Some Patterns of Manifest Anxiety. <i>O'Connor, J. P., et al.</i> ..	160
A Factor Analysis of Schizophrenics Rated on the Activity Rating Scale. <i>Guertin, W. H.</i> ..	163
The Family Drawing Test. <i>Reznikoff, M., and H. R.</i> ..	167
Circular Pencil Maze Performance in Chronic Schizophrenics. <i>Peters, H. N.</i> ..	170
The Role of Anxiety in Psychodiagnosis. <i>Zimet, C. N., and Brackbill, G. A.</i> ..	173
Q-Technique Applied to a Patient and the Therapist in a Child Guidance Setting. <i>Frisch, P., and Cranston, R.</i> ..	178
A Modified Free Association Technique. <i>Mills, E. S.</i> ..	182
The Knox Cube Backward (KCB) as a Performance Test of General Intelligence. <i>Levinson, B. M.</i> ..	185
A Study of Action in the Fantasy of Physically Handicapped Children. <i>Richards, T. W., and Lederman, R.</i> ..	188
The Shipley-Hartford Scale and the Porteus Maze Test as Measures of Functioning Intelligence. <i>Bennett, H. J.</i> ..	190
The Use of the Bender Gestalt Test with Epileptic Children. <i>Shaw, M. C., and Cruickshank, W. M.</i> ..	192
Picture Frustration Study Normative Data for Some Cultural and Racial Groups. <i>McCary, J. L.</i> ..	194
Prediction of Intelligence from Certain Rorschach Factors. <i>Fielding, B., and Brown, F.</i> ..	196
Comparison Data on the Weschler-Bellevue and the WAIS. <i>Cole, D., and Weleba, L.</i> ..	198
Performance of Hospitalized Psychiatric Patients on the Kent Emergency Test and the Wechsler-Bellevue Intelligence Scale. <i>Robinowitz, R.</i> ..	199

VOL. 104

J. COMP. NEUR.

FEBRUARY, 1956

Autonomic Neuroaffecter Formations. <i>Kuntz, A., and Napolitano, L. M.</i> ..	17
A Fiber Analysis of the Vagus Cardiac Rami and the Cervical Sympathetic Nerves in the Dog. <i>Greenberg, S. R.</i> ..	33
The Cephalic Lateral Line System in Some Sunfishes. <i>Moore, G. A.</i> ..	49
Cortical Projection of the Thalamic Ventrolateral Nuclear Group in Monkeys. <i>Chow, K. L., and Pribram, K. H.</i> ..	57
Descending Connections to the Inferior Olive. <i>Walberg, F.</i> ..	77

APRIL

Nucleolar and Nissl Substance Development in Nerve Cells. <i>La Velle, A.</i> ..	175
The Spino-bulbar Tracts and the Pelvic Sensory Vagus. <i>Kuru, M.</i> ..	207
A Microphotometric Method of Cell Enumeration within the Cerebral Cortex of Man. <i>Ryzen, M.</i> ..	233
An Experimental Study of the Fornix System of the Rat. <i>Nauta, W. J. H.</i> ..	247
Localisation and Threshold Studies of Electrically-induced Seizures in the Salamander. <i>Peters, J. J., and Vonderahe, A. R.</i> ..	273

VOL. 48

J. COMP. PHYSIOL. PSYCHOL.

DECEMBER, 1955

The Functional Independence of Two Discrimination Habits Associated with a Constant Stimulus Situation. <i>Goodwin, W. R., and Lawrence, D. H.</i> ..	437
Some Properties of the Warning Stimulus in Avoidance Behavior. <i>Sidman, M.</i> ..	444
The Effect of a Rachitogenic Diet on the Hoarding Behavior of Rats. <i>Gross, N. B., et al.</i> ..	451
Effects of Hypophysectomy on Behavior in Rats. III. <i>Stone, C. P., and Miner, N.</i> ..	456

Pattern Perception Following Insertion of Mica Plates into Visual Cortex. <i>Sperry, R. W., et al.</i>	463
Interocular Transfer of Pattern Discrimination in Cats Following Section of Crossed Optic Fibers. <i>Myers, R. E.</i>	470
Certain Differential Effects of Left and Right Cerebral Lesions in Human Adults. <i>Reitan, R. M.</i>	474
*Effect of Unilateral Brain Injury in Man on Learning of a Tactual Discrimination. <i>Ghent, L., et al.</i>	478
An Effect of ECT on a Conditioned Avoidance Response. <i>Heistad, G. T.</i>	482
*A Further Study on the Retroactive Effect of ECS. <i>Thompson, R., and Dean, W.</i>	488
*Analysis of the Effects of Frontal Lesions in Monkey. I. <i>Mishkin, M., and Pribram, K. H.</i>	492
Locomotor Reaction Decrement in Normal and Brain-Damaged Monkeys. <i>French, G. M., and Harlow, H. F.</i>	496
The Effect of Fluid Deprivation on Taste Deficits Following Cortical Lesions. <i>Benjamin, R. M.</i>	502
The Effect of Adrenaline on a Conditioned Avoidance Response. <i>Kosman, M. E., and Gerard, R. W.</i>	506

Effect of Unilateral Brain Injury in Man on Learning of a Tactual Discrimination

This study was concerned with the effect of unilateral brain injury on learning of a tactile pattern discrimination. The experimental group consisted of 36 Ss with unilateral, penetrating brain injury; the control group consisted of 19 Ss with leg injuries.

In the control group, significant and equal amounts of improvement occurred with each hand. In the brain-injured group, the hand on the same side as the injury showed significant improvement, comparable to that of the control group. The hand opposite the lesion, however, did not show significant improvement. This lack of improvement was not related to sensory defect, nor was it related to the lobe injured.

Thus, an impairment in learning appeared after unilateral brain injury, but this impairment was confined to the side opposite the lesion. These data emphasize the importance, for some learning, of that hemisphere which receives the main projections from the stimulated surface.

(Authors' Abstr.)

A Further Study on the Retroactive Effect of ECS

Five groups of rats were given training on a horizontal-vertical discrimination problem. For four groups, one electroconvulsive shock was administered at 10 sec., 2 min., 1 hour, and 4 hour, respectively, after reaching the criterion of mastery. The fifth group constituted the normal controls. Two days later, all groups were required to relearn the discrimination.

The results of this study showed the following:

1. The groups receiving a shock at 10 sec., 2 min., and 1 hour after mastering the discriminative response showed significant deficits in memory of the habit, the deficit being inversely related to the time interval.

2. There was no significant difference in retention of the habit between the control Ss and those Ss receiving a shock 4 hour after learning the problem. These results were discussed in terms of a perseveration theory of memory.

(Authors' Abstr.)

Analysis of the Effects of Frontal Lesions in Monkey. I. Variations of Delayed Alternation

Four operates with lesions of lateral frontal granular cortex and four operated controls were trained on a series of delayed alternation problems presented in the following order: "left-right" alternation, "up-down" alternation, and "go-no-go" alternation. The control operates required an increasing number of trials to learn the consecutive problems, but all attained criterion on all three tasks. The anterolateral frontal operates, in contrast, failed, within the limits of training, to achieve 90 per cent. correct performance on any of the tasks, although their final scores on "go-no-go" alternation fell just short of this criterion. The relatively successful performance of the anterolateral frontal operates on the "go-no-go" procedure cannot be explained entirely as an effect of general delayed-alternation training since comparable improvement did not appear on the classical problem when this task was given subsequently. The results suggest that while difficulty specific to the "left-right" response choice cannot account for frontal operates' severe impairment on traditional delayed-response-type tasks, some factor other than, or in addition to, the delay would appear to be of critical importance.

(Authors' Abstr.)

The Effect of Early Experience on Behavior and Growth Characteristics. <i>Weininger, O.</i>	1
Psychological Test Performance as a Function of Lateral Localization of Cerebral Lesion. <i>Heilbrun, A. B., jun.</i>	10
Activity as an Autonomous Drive. <i>Hill, W. F.</i>	15

Performance of Rhesus Monkeys on Selected Laboratory Tests, etc. <i>Davis, R. T., et al.</i>	20
Successive and Maintained Conditioning in Spinal Carnivores. <i>Dytman, R. A., and Shurrager, P. S.</i>	27
*Analysis of the Effects of Frontal Lesions in Monkey. II. <i>Mishkin, M., and Pribram, K. H.</i>	36
*Analysis of the Effects of Frontal Lesions in Monkey. III. <i>Mishkin, M., and Pribram, K. H.</i>	41
*Immediate and Chronic Disturbances on the Delayed Response Following Transection of Frontal Granular Cortex in the Monkey. <i>Orbach, J.</i>	46
Anxiety Indicators in an Avoidance Response during Conflict and Non-conflict. <i>Winnick, W. A.</i>	52
The Effects of Repeated Doses of Total-Body X-Radiation on Motivation and Learning in Rhesus Monkeys. <i>Harlow, H. F., and Moon, L. E.</i>	60
Effects of Overtraining in Conflict. <i>Kempe, J. E., and Brown, K. B.</i>	66
The Utilization of Light as Exteroceptive Motivation in the Comet Goldfish. <i>Cole, M. B., and Caldwell, W. E.</i>	71
The Role of the Intertrial Interval in Discrimination and Reversal Learning. <i>Sarason, I. G., et al.</i>	77
Discrimination Learning and Vertical vs. Horizontal Stimulus Relationships. <i>Miller, R. E., and Murphy, J. V.</i>	80
Some Determinants of Play and Exploration in Chimpanzees. <i>Welker, W. I.</i>	84
Stimulus Context and Satiation. <i>Kivy, P. N., et al.</i>	90
Response by the Rat to Environmental Change. <i>Dember, W. N.</i>	93
Effects of Cochlear Lesions on the Threshold Responses of the Auditory Cortex in Chronic Experiments. <i>Kimura, R. S., et al.</i>	96

Analysis of the Effects of Frontal Lesions in Monkey. II. Variations of Delayed Response

The performance of four frontal and four temporal control operates was compared on a series of eight delayed-response tasks. These tasks included traditional delayed response and three variations, each presented by both the direct and indirect methods of baiting. The variations of delayed response employed (a) nonpositional instead of positional predelay cues; (b) a "go-no-go" instead of a left-right response choice; and (c) both cue and response variations combined. The results demonstrated that frontal operates perform nearly as well as control animals whenever traditional predelay cues are replaced by nonpositional cues, irrespective of the response choice, or whether direct or indirect baiting is employed. These findings suggest that frontal operates' impairment on traditional delayed-response-type problems is related, not only to the delay, but to some aspect of the predelay cue as well.

(Authors' Abstr.)

Analysis of the Effects of Frontal Lesions in Monkey. III. Object Alternation

Four frontal operates were trained approximately one year after surgery on an object alternation task, and their performance compared with (a) their own performance on classical spatial alternation and (b) the performance of four temporal operates on the object alternation. Results demonstrated that frontal lesions interfere equally with performance on both forms of alternation. This conclusion as confirmed in a second experiment that investigated retention on the two tasks following anterofrontal and inferotemporal lesions. On the basis of the results of the current experiment, the successful performance of frontal operates on delayed-response-type problems observed in earlier experiments was accounted for in terms of the "distinctiveness" which the predelay cues had acquired from contiguity with distinctive responses and differential reward.

(Authors' Abstr.)

Immediate and Chronic Disturbances on the Delayed Response Following Transection of Frontal Granular Cortex in the Monkey

Four rhesus monkeys were trained on the delayed response prior to surgery. They were tested within a few hours following a trephining procedure and for several days thereafter, within a few hours following frontal lobotomy and for 14 days thereafter, and just before sacrificing several weeks later. The data indicate that

1. Effects of lobotomy appeared within 1½ to 6 hours following surgery. No delayed effects were detected.
2. Primary effects persisted for at least 10 weeks.
3. Transient effects, possibly not the direct result of the primary lesion, disappeared by the 5th to the 13th day.

These results are discussed in relation to the logic of the ablation method.

(Author's Abstr.)

Resistance to Extinction of Verbal Responses Following Two Patterns of Reinforcement. <i>Fattu, N., and Mech, E. V.</i>	193
Influences on Perception of Previous Experience with Ambiguous and Non-ambiguous Stimuli. <i>Luchins, A. S., and E. H.</i>	199

Repression and Concept Formation. <i>Schneiderman, L.</i>	213
The Relationship Between Conditioning and Higher Learning. <i>Welch, L.</i>	221
Some Unresolved Problems in Ego Psychology. <i>Rosenman, S.</i>	231
Configurational Constancy. I. <i>Sheer, D. E., and Worchel, P.</i>	265
Perceptual-motor Task Achievement under Two Conditions of Stimulus Display. <i>Craig, E. A.</i>	281
The Effect of Localised Monaural Cues on a Visually Controlled Turning Movement. <i>Horne, E. P., and Eschenbach, A. E.</i>	287
A Serial Position Effect in "Incidental Learning". <i>Goldstein, R., and Solomon, R. L.</i>	293
Hypothesis Selection as a Function of Previous Reinforcement of Components of the Hypothesis. <i>Lawson, R., et al.</i>	299
The Instinctual Origin of Language. <i>Baker, S. J.</i>	305
The Effect of Set on Mosaic Test Performance. <i>Horne, E. P., and Bliss, W.</i>	329
Basic Similarities on Hull and Tolman. <i>Waters, R. H.</i>	325
Factor Analysis of a Questionnaire Test of Perseveration. <i>Weisgerber, C. A.</i>	341

VOL. 54

JANUARY

1956

Transfer in Problem Solution as Related to the Type of Training. <i>Crannell, C. W.</i> ..	3
The Effects of Auditory Distraction on the Performance of Monkeys. <i>Butler, R. A., and Harlow, H. F.</i>	15
Discontinuous Pursuit Performance by Rhesus Monkeys. <i>Harlow, H. F., and Butler, R. A.</i>	21
Picture Test Identification as a Function of "Reality" (color) and Similarity of Picture to Subject. <i>Lubin, N. M., and Wilson, M. O.</i>	31
Reinforcement of Components and of Similar Patterns as Factors in Determining Hypothesis Selection in Problem Solving. <i>Hillik, W. A., et al.</i>	39
The Perception of Human Action. <i>Lyons, J.</i>	45
The Perception of Form in an Unstructured Field. <i>Nelson, T. M., and Bartley, S. H.</i>	57
The Influence of the Spatial Context on the Relearning of a Rotated Perceptual-Motor Task. <i>Worchel, P., and du Mas, F.</i>	65
Sensory Contributions to Human Maze Learning. <i>Berg, J., and Worchel, P.</i>	81
Clustering in Recall as a Function of the Number of Word-categories in Stimulus-word Lists. <i>Bousfield, W. A., and Cohen, B. H.</i>	95
The Role of the Attendant in Authority and Compliance. <i>Hyde, R. W., et al.</i>	107
Mixture of Writing with Drawing as a Psychotic Behavior. <i>Robertson, J. P. S.</i>	127
Psychologists' Attitudes on Psychological Issues. <i>Morrow, W. R.</i>	133
Reinforcement in Learning Theory. <i>Waters, R. H.</i>	149

VOL. 54

APRIL, 1956

Intersensory Effects of Visual Stimuli on the Minimum Audible Threshold. <i>O'Hare, J. J.</i>	167
Verbal Inhibition in Subception. <i>Lowenfeld, J., et al.</i>	171
Stimulus Generalization in Subception. <i>Rubensfeld, S., et al.</i>	177
Individual Differences Between Clustering and Recall of Meaningful Words. <i>Sakoda, J. M.</i>	183
Anxiety, Threat and Defensive Reaction. <i>Chodorkoff, B.</i>	191
The Investigation of Changes in Directional Reactions on the Szondi Test. <i>Fleishman, M.</i>	197
Judged Size and Personal Relevance. <i>Bevan, W., and D. C.</i>	203
Introduction to a Threshold Concept of Primary Drives. <i>Ausubel, D. P.</i>	209
Latent Learning after Drive Shift and Solution Shift in Human Discrimination Learning. <i>Minturn, L.</i>	231
A Study of Temporal Changes in the Organization of Retention. <i>Brand, H.</i>	243
Perseverative Interference in Monkeys Following Bilateral Removal of the Prefrontal Areas. <i>Settlage, P., et al.</i>	255
Response "Predictability" in a Complex Multiple Choice Situation. <i>Fattu, N. A., et al.</i>	263
A Situational Determiner of the Einstellung-effect. <i>Benedetti, D. T.</i>	271
Effects of Knowledge of Performance. <i>Ammons, R. B.</i>	279

VOL. 87

J. GENET. PSYCHOL.

SEPTEMBER, 1955

The Performance of Goldfish in the Maze Situation with the Utilization of Temperature as Motivation and its Reduction as Reinforcement. <i>Caldwell, W. E., and Tiedemann, J. G.</i>	3
The Role of the Acquired Distinctiveness of Cues in the Acquisition of a Motor Skill in Children. <i>Smith, S. L., and Goss, A. E.</i>	11
Dependency and Independence in Young Children. <i>Beller, E. K.</i>	25
Emotional Dependence and Independence in Nursery School Play. <i>Heathers, G.</i>	37
Interpersonal Perceptions of Fathers and Mothers. <i>Tasch, R. J.</i>	59
The Performance of Hamsters in the Maze Situation Utilizing Gravitation and the Vestibular Sense as Motivation. <i>Caldwell, W. E., and Richmond, R. G.</i>	67

Effects of Cortical Lesions upon the Onset of Hoarding in Rats. <i>Stamm, J. S.</i> ..	77
Methods of Evaluating the Group Psychotherapy of Unstable Defective Delinquents. <i>O'Connor, N., and Yonge, K. A.</i> ..	89
Personality Differences between Responsible and Less Responsible Children. <i>Harris, D. B., et al.</i> ..	103
Retests of Children Given Mental Tests as Infants. <i>MacRae, J. M.</i> ..	111
The Relationship Between Heredity, Sex, and Aggression in Two Inbred Mouse Strains. <i>Fredericson, E., et al.</i> ..	121
The Discrimination of Sex Differences by Young Children. <i>Katcher, A.</i> ..	131

DECEMBER

The Personality of Diabetic Children. <i>Johannsen, D. E., and Bennett, E. M.</i> ..	175
Attention Spans of Children for Experimentally Designed Toys. <i>Moyer, K. E., and von Haller Gilmer, B.</i> ..	187
The Behaviour of the Opossum in the Guthrie-Horton Box. <i>James, W. T.</i> ..	203
The Performance of Albino Mice in the Maze Situation Utilizing Gravitation and the Vestibular Sense as Motivation. <i>Caldwell, W. E., and Ostrich, R.</i> ..	207
The Performance of Albino Mice in the Maze Situation Utilizing Gravitation and its Relative Absence as Reinforcement. <i>Caldwell, W. E., and Ostrich, R.</i> ..	215
Variation in Social Facilitation of Eating Behavior in Puppies. <i>James, W. T., and Cannon, D. J.</i> ..	225
Hereditary Differences in Trainability of Purebred Dogs. <i>Fuller, J. L.</i> ..	229
Partial Reinforcement Related to Massed and Spaced Training in a Classroom Situation. <i>Auble, D., et al.</i> ..	239
Partial Reinforcement in a Bar-pressing Situation with Preschool Situation. <i>Fattu, N., et al.</i> ..	251
Flicker Fusion in the Rat. <i>Goldzband, M. G., and Clark, G.</i> ..	257
Time Records in Human Maze Learning and their Comparison with Maze Records. <i>Scott, T. C.</i> ..	268
Acquiring Dependence and Independence. <i>Heathers, G.</i> ..	277
The Utilization of Light Avoidance as Motivation in the Investigation of Perceptual Differentiation in the Pigeon. <i>Caldwell, W. E., and Richmond, R. G.</i> ..	293
A Comparison of Normals and Subnormals in Mirror Drawing. <i>Reynolds, W. F., and Stacey, C. L.</i> ..	301
Differential Decline in Graduate Record Examination Scores with Age. <i>Osborne, R. T., and Sanders, W. B.</i> ..	309

VOL. 88

MARCH, 1956

The Utilization of Temperature Change as Motivation and Reinforcement in the Maze Performance of Albino Mice. <i>Caldwell, W. E., et al.</i> ..	3
Infantile Experience and Adult Behavior in the White Rat. <i>Littman, R. A.</i> ..	11
Learning the Relation of Opposition as Related to Score on the Wechsler Intelligence Scale for Children. <i>Rabinowitz, R.</i> ..	25
Investigations of the Behavior of <i>Paramecium aurelia</i> . III. <i>Gelber, B.</i> ..	31
A Study of the Learning Characteristics of Public Health Nurses in Relation to Mental Health Education and Consultation. IV. <i>Kline, M. V., and Cumings, R.</i> ..	37
Some Changing Aspects of the Self-concept of Pubescent Males. <i>Smith, W. D., and Lebo, D.</i> ..	61
Some Stimulus Variables Affecting the Discrimination of Objects by Monkeys. <i>Warren, J. M.</i> ..	77
A Szondi Study of Developmental and Cultural Factors in Personality. <i>Fancher, E. C., and Weinstein, M.</i> ..	81
A Comparative Study of Adolescents with the Szondi Test. <i>Fancher, E. C.</i> ..	89
Anderson's Overlap-hypothesis and the Discontinuities of Growth. <i>Hofstaetter, P., and O'Connor, D. P.</i> ..	95
Discrimination Learning and Discrimination Reversal Learning in Normal and Feeble-minded Children. <i>Plenderleith, M.</i> ..	107
Spatial Learning from Different Positions in a Room. <i>Feddersen, W. E., and Lynn Brown, W.</i> ..	113
Unconditioned Operant Behavior in Two Homozygous Strains of Mice. <i>Kish, G. B., and Antonitis, J. J.</i> ..	121

VOL. 122

J. NERV. MENT. DIS.

OCTOBER, 1955

A Study of Chlorpromazine. <i>Hall, R. A., and Dunlop, D. J.</i> ..	301
Bilateral Breast Phantom and Breast Phantom Pain. <i>Bressler, B., et al.</i> ..	315
Bacteriological Studies on the Etiology and Chlorpromazine Treatment of Schizophrenia and Related Mental Disorders. <i>Rosenow, E. C.</i> ..	321
Suicidal Responses on the Rorschach Test. <i>Sakheim, G. A.</i> ..	332
Status Denial in Group Psychoanalysis. <i>Mullan, H.</i> ..	345
Medication into Submission. <i>Meerloo, J. A. M.</i> ..	353

The Effects of Non-interpretation of Dreams During Psychotherapy. <i>Pine, Q.</i> ..	361
The Othello Syndrome. <i>Todd, J., and Dewhurst, K.</i> ..	367
Attitudes of Mentally Ill Patients Towards Death. <i>Feifel, H.</i> ..	375
Unusual Paranoid Manifestations in a Case of Psychomotor Epilepsy and Narcolepsy. <i>Thigpen, C. H., and Mors, B. F.</i> ..	381
On Touch as a Special Sense. <i>Taft, A. E.</i> ..	386
Spontaneous Recovery from Gross Suicidal Overdosage with Methylpentynol. <i>Glott, M. M.</i> ..	390
Concerning the Constancy of the External Environment in Schizophrenia. <i>Davidson, G. M., and Wise, B. V.</i> ..	393
The Missing Ring. <i>Greenbank, R. K.</i> ..	397

NOVEMBER

Prospects in Psychopharmacology. <i>Himwich, H. E.</i> ..	413
*Cerebral Electrographic Changes Induced by LSD and Mescaline are Corrected by Frenquel. <i>Rinaldi, F., and Himwich, H. E.</i> ..	424
*Rhinocephalic Activity During Thought. <i>Lesse, H., et al.</i> ..	433
*Chemical Constituents of Human Brain. <i>Himwich, W. A., et al.</i> ..	441
Schizophrenia. <i>Hoffer, A., and Osmond, H.</i> ..	448
The Possible Role of Inhibition at Adrenergic Synapses in the Mechanism of Hallucinogenic and Related Drug Actions. <i>Marrazzi, A. S., and Hart, E. R.</i> ..	453
*Clinical, Psychological and Myoneural Changes in Psychotic Patients under Oral Serpasil Medication. <i>Finn, M., et al.</i> ..	458
*Studies on Mescaline. VI. <i>Denber, H. C. B., and Merlis, S.</i> ..	463
Preliminary Studies of the Metabolism of LSD Using Radioactive Carbon-Marked Molecules. <i>Boyd, E. S., et al.</i> ..	470
Investigation of Effects of Intravenous Reserpine in Disturbed Psychotic and Brain-Damaged Patients. <i>Dice, N., et al.</i> ..	472
*Pharmacotherapy in Children with Psychiatric Illness. <i>Freedman, A. M., et al.</i> ..	479
*Studies in Human Cerebral Function. <i>Berlin, L., et al.</i> ..	487
An Evaluation of the Clinical Significance of Reserpine. <i>Tyhurst, J. S., and Richman, A.</i> ..	492
Summary of Papers on Drugs Affecting Behavior. <i>Rinkel, M.</i> ..	496

The Cerebral Electrographic Changes Induced by LSD and Mescaline are Corrected by Frenquel

1. A cerebral electrographic change, consisting in a long lasting alerting effect, follows the injection into rabbits of (LSD) in small amount (1-15 gamma/kg.) and of mescaline. These findings correlate with (EEG) observations in psychotic patients and in volunteers under the action of (LSD) and mescaline.

2. Frenquel, which corrects the (LSD)-induced experimental psychoses, also eliminates the electrographic changes evoked by (LSD) and mescaline.

3. (LSD) in large amounts (20-60 gamma/kg.) has an effect on the cerebral electrical activity opposite to the one produced by small doses (1-15 gamma/kg.). This is correlated with the observation that (LSD) in very large quantities has a tranquilizing action.

4. These observations are tentatively explained on the basis of their pharmacological data and those of others. The production of electrographic alertness by the hallucinogenic drugs and their psychotogenic effect are attributed to a serotonin-facilitating property. The correction of the electrographic (LSD) or mescaline-induced abnormalities by the use of Frenquel is attributed to the serotonin inhibiting properties of that drug.

(Authors' Abstr.)

Rhinocephalic Activity During Thought

Patients with chronically implanted cortical and subcortical electrodes provided an opportunity for an exploratory study of the electrical activity of these areas during interview. These studies demonstrate distinct, reproducible changes in electrical recordings localized to the amygdaloid and rostral hippocampal regions. These changes were correlated with both thought activity elicited during directed interviews and occurring spontaneously. It was suggested that this type of rhinocephalic activity is related to emotionally significant memories. Similar electrical responses were elicited by olfactory stimuli and thoughts related to odors.

(Authors' Abstr.)

Chemical Constituents of Human Brain

Areas from the brains of fetuses and babies dying in the neonatorum as well as from adult brains have been analyzed for water, cholinesterase, total nitrogen and free L-glutamic acid.

Cholinesterase activity is highest in the caudate both in the young and in the adult. In cortex, thalamus and superior colliculi, this enzyme appears to decrease with age.

In the immature brains, the distribution of total nitrogen and of free L-glutamic acid follows a neurophyletic pattern. In the adult brains this pattern is apparent only for water. Both nitrogen and L-glutamic acid increase in the adult brains on a fresh tissue basis.

Analyses of samples taken from different areas of the cortex suggest that each area has a unique chemical composition.

The relation of these findings to data available for other species is discussed.

(Authors' Abstr.)

Clinical, Psychological and Myoneural Changes in Psychotic Patients Under Oral Serpasil Medication

1. Eighteen out of 22 severely disturbed chronic schizophrenics from the maximum security ward of a state hospital showed improvement under oral Serpasil treatment; half of them, marked improvement.

2. Clinical rating, psychometric, projective and expressive psychological tests basically agree on the effectiveness of the drug.

3. The authors feel that present psychological tests are not adequate for the quantitative evaluation of changes in severely psychotic patients.

4. Due to cautious increase of individual doses and adherence to oral medication, side reactions were minimal.

(Authors' Abstr.)

Studies on Mescaline. VI. Therapeutic Aspects of the Mescaline-Chlorpromazine Combination

1. The use of mescaline and chlorpromazine as a therapeutic technique has been described.

2. Eighteen of 40 acutely ill patients showed a complete remission of symptoms, and seven showed a partial improvement. Only seven of 17 chronically ill patients showed any improvement at all.

3. The therapeutic action was most marked in those patients who had been ill a short period of time before admission and were rapidly treated after admission.

4. Mescaline-chlorpromazine is most valuable as a therapeutic technique when used in a psychodynamic frame of reference.

(Authors' Abstr.)

Pharmacotherapy in Children With Psychiatric Illness

1. One hundred and ninety-five children on a psychiatric ward have been treated with a series of six drugs: Benadryl, Tolserol, Artane, Ambodryl, Thorazine and Serpasil. A methodology is described for the study of such compounds that includes the use of placebo.

2. The Benadryl appears to have the best over-all effect and was particularly helpful in those children with primary behavior disorders displaying anxiety.

3. Thorazine was most beneficial for hyperkinetic, agitated, schizophrenic children.

4. Tolserol produced improvement in children with the diagnosis of organic brain disorder.

5. The results with Artane, Ambodryl and Serpasil did not appear to be significantly different from those obtained with placebo.

6. The drugs did not appear to alter the basic psychopathology found in the children.

7. Pharmacological agents have an indisputable role in the management of children in a psychiatric hospital setting.

8. Necessity for further research in this area is indicated.

(Authors' Abstr.)

Studies in Human Cerebral Function: The Effects of Mescaline and Lysergic Acid on Cerebral Processes Pertinent to Creative Activity

The action of mescaline and lysergic acid was that of inhibition or depression of the usual regulated activities of the subjects. The four graphic artists who ingested these drugs had impairment of their highest integrative functions as described above.

They, nevertheless, created works of greater esthetic value appeal according to the panel of fellow artists, but this was associated with a relaxation of control in the execution of lines and employment of color, so that both color and line were freer and bolder. The effects on sensory function were such as to augment the perception of dull areas in their paintings, but detached the colors from their relationship to the whole esthetic structure. Furthermore, the benefits derived from these agents were offset by the difficulty these subjects had in mobilizing their perceptions and energies in the pursuit of creative art.

(Authors' Abstr.)

DECEMBER

*A Comparative Study of the Effect on Anxiety of Chlorpromazine, Reserpine, Phenobarbital, and a Placebo. <i>Rosner, H., et al.</i>	505
*Controlled Study on Clinical Use of Reserpine in Psychotic Patients. <i>Schruet, A. H.</i>	513
The Physiology of Tremor and Nystagmus. <i>Stanley-Jones, D.</i>	518
Psychological Patterns and Outcome in Pulmonary Tuberculosis. <i>Korkes, L., and Lewis, N. D. C.</i>	524
Hypnotic Phenomena, Including Hypnotically Activated Seizures, Studied with the EEG. <i>Schwarz, B. E., et al.</i>	564

A Unitary Hypothesis of Disorganization. <i>Wiedorn, W. S.</i>	575
Spontaneous Seizures and Related EEG Findings Following Shock Therapy. <i>Blumenthal, I. J.</i>	581
Variables in the Clinical Evaluation of a Hypnotic Drug with a Clinical Evaluation of Glutethimide. <i>Pollack, S., and Takakjian, M.</i>	589

A Comparative Study of the Effect on Anxiety of Chlorpromazine, Reserpine, Phenobarbital, and a Placebo

This investigation was undertaken to evaluate the relative effectiveness of Chlorpromazine, Reserpine, Phenobarbital and a placebo on symptomatic manifestations of anxiety. A total of 84 voluntary psychiatric admissions in a V.A. General Hospital completed a 30-day course of one of these four preparations. Subjective, psychiatric, physiological and psychological measures were employed to evaluate changes before and after treatment. The findings of this investigation revealed:

1. Patients in each of the four groups reported a significant reduction in the number of manifest symptoms of anxiety after the 30-day treatment. When the drugs were compared with each other, no significant differences were found.

2. On an anxiety rating scale completed by each patient before and after treatment, significant differences in diminution of over-all anxiety were achieved in all the groups, except placebo. No significant differences were found when the groups were compared with each other.

3. When the patients were evaluated psychiatrically before and after treatment, significant improvement was evidenced in all groups except patients on Phenobarbital. When Chlorpromazine was compared with Phenobarbital, a significant difference was found in favor of Chlorpromazine. All other group comparisons yielded negative results.

4. The critical flicker fusion test was employed to evaluate levels of anxiety. Patients in the Reserpine group alone demonstrated significant changes in the critical flicker fusion score upon completion of treatment. It is to be noted that the Reserpine lower post-treatment CFF score was in the opposite direction to that hypothesized in previous research studies. These findings would suggest the desirability of further study. Several possibilities emerged from this investigation. While it has been formulated that "the anxious person being preoccupied with the internal state of affairs directs less attention to the external reality, flicker" (3), it may very well be that with certain levels of anxiety, the anxious person has need to hold on to reality longer. There may also be a physiological factor in Reserpine and possibly Chlorpromazine which independently effects the visual response to the CFF (12).

5. The association of weight gain and reduction in anxiety is a common clinical observation. Significant weight gains were recorded only with patients in the Reserpine group. These patients differed significantly from patients on Phenobarbital and Chlorpromazine with respect to weight changes.

6. Reserpine patients were the only group to demonstrate significant reductions in systolic and diastolic blood pressure. On Chlorpromazine, a significant reduction was noted only in systolic blood pressure. However, in neither case did the lowered blood pressure produce any untoward side effect.

7. When Reserpine and placebo patients were compared, significant differences were found in weight, systolic and diastolic blood pressure, and on the critical flicker fusion test. A significant weight difference favoring Reserpine was indicated when Reserpine and Chlorpromazine were compared. A significant difference in favor of Reserpine was similarly found on the CFF test when this drug was compared with Phenobarbital.

One patient on Chlorpromazine developed hepatitis, and one patient on Phenobarbital became dizzy and hypotensive. No other untoward effect accompanied the utilization of any of the drugs (10).

In evaluating the results of this study, consideration should be given to the limiting effects of the influence of hospitalization, the nature of the psychiatric patient population, the duration of the course of treatment and the dosages employed. The over-all results of this study indicate that each drug was efficacious in reducing symptomatic manifestations of anxiety. While isolated instances pointed to the superiority of Reserpine and Chlorpromazine, few significant differences were observed when the drugs were compared with each other. Previous research and clinical experience at this and other hospitals suggest that Chlorpromazine and Reserpine are far more effective with marked agitation and panic states than with the alleviation of the kind of overt manifestations of anxiety studied in this investigation.

(Authors' Abstr.)

Controlled Study on Clinical Use of Reserpine in Psychotic Patients with Special Comments on Sources of Error

A controlled study was conducted on 195 patients, 151 of whom were on reserpine and 44 of whom were on a placebo for 4½ months. Of the patients on reserpine 23·2 per cent. showed marked improvement, 37 per cent. showed moderate improvement, and 27·2 per cent. showed slight improvement. Of the 44 controls on placebo only 4·5 per cent. showed improvement, and 29·5 per cent. showed slight improvement.

Observations concerning possible errors in a clinical study of this nature are described.

Hence the need for further verification of the clinical value of reserpine in mental disease is required.

If ultimately proved to be effective, even in a moderate percentage of cases, its potential therapeutic value is immense.

The use of such a drug to further investigate mental mechanisms may also be significant. (Author's Abstr.)

VOL. 123

JANUARY, 1956

*The Effects of Reserpine on the Chronic Disturbed Schizophrenic. <i>Naidoo, D.</i>	1
The Problem of Time in Philosophy, Neurophysiology and Psychiatry. <i>Chessick, D.</i>	14
Semantic Aphasia. <i>Riese, W.</i>	18
Malingering. <i>Flicker, D. J.</i>	23
Transference and Countertransference in Somatic Therapies. <i>Abse, D. W., and Ewing, J. A.</i>	32
The Rorschach Reaction Patterns of Maternally Overprotected and Maternally Rejected Schizophrenic Patients. <i>Brecher, S.</i>	41
Serpasil as an Adjunct to Brief Intensive Psychotherapy. <i>Westcott, G. F.</i>	53
*The Use of Metrazol as a Mood Conditioning Drug. <i>Kass, I., and Brown, E. C.</i>	57
*An Attempt to Demonstrate a Catatonigenic Agent in Cerebrospinal Fluid of Catatonic Schizophrenic Patients. <i>Shapiro, A. K.</i>	65
Similar Antiphlogistic Reactions after Prefrontal Lobotomy and Treatment with Chlorpromazine. <i>Kramer, H. C.</i>	72
*Kemadrin, a New Drug for Treatment of Parkinsonian Disease. <i>Lerner, P. F.</i>	79

The Effects of Reserpine (Serpasil) on the Chronic Disturbed Schizophrenic: A Comparative Study of Rauwolfia Alkaloids and Electroconvulsive Therapy

The effect of Serpasil was studied in 80 severely ill long-stay schizophrenic patients to determine whether its use would prove superior to, equal to, or inferior to electroconvulsive therapy as a maintenance measure.

These patients formed a homogeneous group of "difficult management problems", requiring excessive medical and nursing care, restraints, heavy sedation, seclusion, hydrotherapeutic and pack treatments. They were divided into four matched groups of 20 each, receiving: A, placebo; B, Serpasil; C, placebo and electroshock; and D, Serpasil and electroshock. To avoid prejudice in the evaluation of improvement, no one except the author knew the design of the experiment.

Two standards for measuring improvement were employed: first, amenability to nursing procedures and the change in the patient as a ward citizen; secondly, clinical improvement, based on psychiatric interviews. The senior nurse and her assistant evaluated the amenability of the patient weekly. The author and a physician with long knowledge of the cases but with no knowledge of their experimental grouping determined the clinical scores weekly for the first eight weeks and then fortnightly. The scores were expressed numerically and plotted graphically in addition to the full recording of medical opinion.

The results showed that Serpasil produced beneficial effects which were superior to maintenance shock treatment in the severely ill long-stay schizophrenics. Twenty-five per cent. of these cases were markedly improved; 50 per cent. were moderately or mildly improved. The remaining 25 per cent., although psychiatrically unimproved, were easier to manage from a nursing standpoint.

These results and techniques of administration of Serpasil are discussed. Best results were achieved by starting with 2.5 mg. parenterally twice daily for the first week and transferring the patient to 5.0 mg. orally twice daily during the second week. Thereafter, the most satisfactory regimen was one that employed individualization of dosage. It is emphasized that favorable results were obtained in cases which had not previously yielded to one or more known methods of treatment.

(Author's Abstr.)

The Use of Metrazol as a Mood Conditioning Drug: A Discussion as to Its Mode of Action

The role of Metrazol as a mood conditioning drug has been carefully evaluated. It is our clinical impression that in arteriosclerotic patients, Metrazol does tend to modify social behavior. Psychometrically, measurable improvement is noted in orientation, in ability to size and comprehend a practical social situation and in associate learning of new and unfamiliar material. However, the same testing shows Metrazol to have a detrimental effect on visual reproduction requiring a high level of integration of visuomotor functioning, and also on the mental control needed for prolonged attention and concentration.

Although the clinical impression of improvement was not as clearly borne out by the psychometric studies, it was felt that a broader spectrum of tests and/or a greater number of subjects might resolve this ambiguity.

The site and mode of Metrazol's action are discussed. This included a reference to the possible relationship between it and the degradation products of epinephrin.

The psychological changes which follow the use of mood conditioning drugs indicate that care should be exercised in their selection. Some of the factors, which may govern the use of tranquilizing as opposed to analeptic therapy, have been presented.

(Authors' Abstr.)

An Attempt to Demonstrate a Catatonigenic Agent in Cerebrospinal Fluid of Catatonic Schizophrenic Patients

An experiment was designed to test the hypothesis that there is a catatonigenic agent in the cerebrospinal fluid of catatonic patients.

Concentrated cerebrospinal fluid from catatonic and mental defective patients, as well as an isotonic saline and an artificially-reconstituted cerebrospinal fluid solution, was injected subcutaneously into young rats. Performance of these rats in a rat-activity wheel was recorded for 24 hours prior to and after the injections.

Although the cerebrospinal fluid from the mental defectives depressed the activity of the rats more than the cerebrospinal fluid from the catatonics in the first 10 to 15 hours and the catatonic fluid depressed the activity of the rats more than the mental defective fluid in the later hours, these differences were not statistically significant. There was a significant difference between the activity of the rats injected with isotonic saline, artificial cerebrospinal fluid and the human fluid in the early hours. Some time after 10 to 15 hours there was no significant difference between any of the groups. The performance of the rats in the activity wheel was related to the hypertonicity of the injected solutions.

The mechanisms determining the different activity curves of the injected animals were discussed, as well as the variables and other difficulties involved in this investigation.

The author's observations did not substantiate the hypothesis that there is a catatonigenic agent in the cerebrospinal fluid of catatonic patients.

(Author's Abstr.)

Kemadrin, a New Drug for Treatment of Parkinsonian Disease

Kemadrin, a new synthetic spasmolytic agent, has been used for periods of three to seven months in combination with other drugs in a series of 30 severe Parkinsonian patients. Twenty-one of these patients showed significant improvement, especially in regard to decreasing rigidity, increasing ability in accomplishment of usual activities, and elevation of mood and alertness. There were very little untoward symptoms with the use of this agent; rather it was possible by decreasing the dosage of the other drugs, in more than half the cases that were improved, to reduce annoying dryness of the mouth, mydriasis, drowsiness, depression and confusion which had complicated the treatment in most of the patients in this series. Twenty of these Parkinsonian sufferers were either of the post-encephalitic type or of unestablished etiology, and 10 could be classified as arteriosclerotic or pre-arteriosclerotic. The choice of patients in this series was based on severity of symptoms and inadequate control of symptoms with the other usual medications employed in the treatment of this illness.

Kemadrin is procyclidine hydrochloride and is closely related to Artane and Patitane. Its therapeutic effects are similar to those of these drugs, but it has considerably less untoward reactions in doses up to 40 to 50 mgm. daily, even without decrease in dosages of the other drugs used in combination. This new drug, Kemadrin, shows promise of definite value in the armamentarium of the physician in the treatment of Parkinsonism, especially in those cases which have not responded favourably to other drugs.

(Author's Abstr.)

VOL. 19 J. NEUR. NEUROSURG. PSYCHIAT. FEBRUARY, 1956

Cryptic Arteriovenous and Venous Hamartomas of the Brain. Crawford, J. V., and Russell, D. S.	1
The Action of the Phosphatases of Human Brain on Lipid Phosphate Esters. Strickland, K. P., et al.	12
The Effect of the Duration of Vitamin-A Deficiency in Female Rabbits Upon the Incidence of Hydrocephalus in Their Young. Millen, J. W., and Woollam, D. H. M.	17
A Clinical Correlation Between Encephalopathy and Papilloedema in Addison's Disease. Jefferson, A.	21
Benign Intracranial Hypertension. Bradshaw, P.	28
Hyperostosis Frontalis Interna. Smith, S., and Hemphill, R. E.	42
A Family with the Progressive Hypertrophic Polyneuritis of Dejerine and Sottas. Bedford, P. D., and James, F. E.	46
Altered Response to Small Doses of Insulin Associated with Electroplexy and Hypoglycaemic Therapies. Marley, E.	57

MAY

Observations on the Extended Use of the Marchi Method. Smith, M. C.	67
The Recognition and Prevention of Artefacts of the Marchi Method. Smith, M. C.	74
Studies in Sensation. Marshall, J.	84
Reference of Sensation at the Spinal Level. Nathan, P. W.	88
Awareness of Bladder Filling with Divided Sensory Tract. Nathan, P. W.	101
EEG Abnormalities from the Temporal Lobe Studied with Sphenoidal Electrodes. Pampiglione, G., and Kerridge, J.	117
The Effect of Insulin Coma and ECT on the Short-term Prognosis of Schizophrenia. Hoening, J., et al.	130
Sodium Amytal and Behaviour in Neurotic Subjects. Laverty, S. G., and Franks, C. M.	137

- Disseminated Sclerosis Treated with Isoniazid with a Method of Evaluating Chronic Neurological Disorders. *Ansell, B. M., and Clarke, E.* 144
 Ischaemic and Post-ischaemic Paraesthesiae. *Poole, E. W.* 148

VOL. 15 J. NEUROPATH. EX. NEUR. APRIL, 1956

- Transneuronal Changes in the Inferior Olive and Pontine Nuclei in Kittens. *Torvik, A.* 119
 Cerebral Infarction Produced by Venous Distention. *Denny-Brown, D., et al.* .. 146
 Variations of Horsley-Clarke Coordinates in Cat Brains with Description of a Stereotaxic Instrument, etc. *Loewenfeld, I. E., and Altman, R.* 181
 Perineuronal Satellite Cells in the Motor Cortex of Aging Brains. *Brownson, R. H.* .. 190
 A Study of Abnormal Blood-Brain Permeability in Experimental Allergic Encephalomyelitis. *Barlow, C. F.* 196

VOL. 19 J. NEUROPHYSIOL. MAY, 1956

- Studies on Water and Electrolytes in Nervous Tissue. I. *Ames, A., and Hastings, A. B.* 201
 Studies on Water and Electrolytes in Nervous Tissue. II. *Ames, A.* 213
 Fiber Groups in Primary Optic Pathway of Cat. *Chang, H.-T.* 224
 Unitary Responses to Afferent Volleys in Amygdaloid Complex. *Machne, X., and Segundo, J. P.* 232
 Cerebellar and Vestibular Influences on Deitersian Units. *de Vito, R. V., et al.* .. 241
 Absence of Colour Vision in the Guinea Pig. *Miles, R. C., et al.* 254
 *Intralaminar Distribution of Cytochrome Oxidase and DPN in Rat Cerebral Cortex. *Pope, A., et al.* 259
 Geniculate and Cortical Responses to Colored Light Flash in Cat. *Lennox, M. A.* .. 271

Intralaminar Distribution of Cytochrome Oxidase and DPN in Rat Cerebral Cortex

The quantitative distributions of diphosphopyridine nucleotide and cytochrome oxidase have been determined within the cytoarchitectonic layers of rat somatosensory isocortex.

DPN concentration is greatest in layers IIa, IIb-IV, and Vc. Cytochrome oxidase activity is rather uniformly distributed through layers I-V but, like DPN, is more active, relative to immediately adjacent zones, in layers IIa, IIb-IV, and in the middle or lower third of layer V. Its activity becomes progressively less as sampling is carried through layer VI into the subcortical white matter.

The intracortical distribution patterns of these respiratory enzymes presumably reflect the relative rates of biological oxidations at the different architectonic levels and indicate that layers II, III, and IV have the highest rates of energy metabolism. The anatomical significance of the architectonic patterns of DPN and cytochrome oxidase has been discussed, and the conclusion reached that their intracortical distributions are consistent with primary localization in the cytoplasmic particles of the nerve cell bodies and their dendrites.

(Authors' Abstr.)

VOL. 13 J. NEUROSURG. MARCH, 1956

- The Role of the Reticular Formation in the Coma of Head Injury. *Foltz, E. L., and Schmidt, R. P.* 145
 Subarachnoid Haemorrhage. *Dunsmore, R. H., and Polcyn, J. L.* 165
 Oligodendrogliomas in the Young-Age Group. *Berkheiser, S. W.* 170
 Fluid and Electrolyte Balance Following Craniotomy. *Wise, B. L.* 223
 Deep Hypothermia in Intracranial Surgery. *Lundberg, N.* 235
 "Polycythemia" Associated with Cerebellar Hemangioblastoma. *Ward, A. A., et al.* 248
 The Surgical Treatment of Arteriovenous Malformation of the Brain. *Hayne, R. A., et al.* 259
 Pinealoma with Metastases in the Central Nervous System. *Fowler, F. D., et al.* .. 271

VOL. 20 J. PROJ. TECHN. MARCH, 1956

- Psychoanalytic Theory and Projective Methods. *Forer, B. R.* 3
 Freud and Projective Techniques. *Bellak, L.* 5
 Gauging Primary and Secondary Processes in Rorschach Responses. *Holt, R. R.* .. 14
 Transference in the Patient's Reaction to the Tester. *Schafer, R.* 26
 Defense Preference in Four Countries. *Blum, G. S.* 33
 Limitations of Projective Techniques. *Korner, A. F.* 42
 A Study of Patients' Identifications from Rorschach Records and Therapists Judgments. *Tolman, R. S., and Meyer, M. M.* 48
 Color Response and Perceptual Passivity. *Shapiro, D.* 52
 The Normal Personality. *Cox, R. D.* 70
 Psychological Study of a School Phobia in One of a Pair of Identical Twins. *Kagan, J.* 78

VOL. 41 J. PSYCHOL. APRIL, 1956

- The Effect of Increased Trials on the Stability of the PGR in an Avoidance Situation. *Novak, S., et al.* 243

Effects of Esthetic Surroundings. <i>Marlow, A. H., and Mintz, N. L.</i>	247
The Variability of Reaction Time in the Sensorimotor Induction Syndrome with Special Reference to the Effect of Colours. <i>Halpern, L., and Kugelmass, K.</i> ..	255
A Tactual-kinaesthetic Curvature Illusion. <i>Edgington, E. S.</i>	271
Regressive Behavior Changes in the Tuberculous Patient. <i>Charen, S.</i>	273
A Comparison Between a Hospitalized and a Normal Group on the X-O Tests. <i>Jones, A. W.</i>	291
The Effect of Organization upon Complex Reaction Time. <i>Flores, I.</i>	301
A Study of Authoritarianism and Psychopathology. <i>Freedman, M., et al.</i> ..	315
Is Mental Illness Mental? <i>Watson, G.</i>	323
Space Localization Under Conditions of Danger. <i>Wapner, S., et al.</i>	335
The Interaction Chronograph as an Instrument for Objective Measurement of Inter- action Patterns during Interviews. <i>Matarazzo, J. D., et al.</i>	347
The Collection and Use of Retrospective Data. <i>Bakan, P.</i>	369
The Construction of an Industrial Selection Personality Test. <i>Clarke, W. V.</i> ..	379
A Suggested Measure of Bivariate Relationship Based on the Ellipse of Concentration. <i>Humm, D. G.</i>	395
The Personality Profiles of Loom Office Managers. <i>Clarke, W. V.</i>	405
Personality Profile of Self-made Company Presidents. <i>Clarke, W. V.</i>	413
The Synonym Vocabulary Test. <i>Lepley, W. M., and Zeigler, M. L.</i>	419
Reinforcement Value as Related to Decision Time. <i>Lotsof, E. J.</i>	427
Subliminal Perception and Subception. <i>Voor, J. H.</i>	437
Effects of Esthetic Surroundings. <i>Mintz, N. L.</i>	459

VOL. 42

J. SOC. PSYCHOL.

AUGUST, 1955

Arab-American Differences in the Judgment of Written Messages. <i>Prothro, E. T.</i> ..	3
An Examination of the Two-factor Theory of Social Attitudes in a Near-Eastern Culture. <i>Keehn, J. D.</i>	13
Professional and Non-professional Women as Mothers. <i>von Mering, F. H.</i>	21
Prediction of Newspaper Bias. <i>Schlesinger, L. E.</i>	35
A Study of the Learning Characteristics of Public Health Nurses in Relation to Mental Health Education and Consultation. <i>Kline, M. V., and Cumings, R.</i>	43
Attitudes of White and Negro Teachers Toward Non-segregation in the Classroom. <i>Turman, J. A., and Holtzman, W. H.</i>	61
Contributions to Role-taking Theory. IV. <i>Sarbin, T. R., and Rosenberg, B. G.</i> ..	71
Expectations and Social Attitudes. <i>Kaplan, W., and Littman, R. A.</i>	83
A Variational Approach to Social Influences on Perception. <i>Luchins, A. S.</i> ..	113
A Social-experimental Approach to Group Psychotherapy. <i>Luchins, A. S.</i> ..	121
A Taxonomy of American Crime Film Themes. <i>Grace, H. A.</i>	129
The Social Stimulus Self and Self Image Related to Personality and Psychotherapy. <i>Kates, S. L., and Jordan, R. M.</i>	137
The Influence of Judge's Attitudes in Three Methods of Attitude Scaling. <i>Kelley, H. H., et al.</i>	147

NOVEMBER

A Proposed Conceptual Integration of Group Dynamics and Group Therapy. <i>Schneider, L. I.</i>	173
Aspiration and Performance in a Simulated Group Atmosphere. <i>Kaiser, R. L., and Blake, R. B.</i>	193
The Relationship of Co-operation to the Sharpening-levelling Continuum. <i>Tear, D. G., and Guthrie, G. M.</i>	203
Repression Elicited by Story Material Based on the Oedipus Complex. <i>Wilkinson, F. R., and Cargill, D. W.</i>	209
Scaling of Attitudes by the Method of Equal-appearing Intervals. <i>Webb, S. C.</i> ..	215
Diagnostic Features of the AGCT. <i>Barnette, W. L., jun.</i>	241
Previous Experience with Ambiguous and Non-ambiguous Perceptual Stimuli under Various Social Influences. <i>Luchins, A. S., and E. H.</i>	249
Perception of Group Functioning as a Predictor of Group Performance. <i>Torrance, E. P.</i>	271
On Conformity with True and False Communications. <i>Luchins, A. S., and E. H.</i> ..	283
Some Group Differences in Personal Values Between American Soldiers and German Prisoners of War. <i>Tureen, L. L., and Palmer, J. O.</i>	305
Comparisons in Personality Self-evaluation. <i>Amatora, M.</i>	315
An Investigation Concerned with Changes of Preference which are Observed after Group Discussion. <i>Lawlor, M.</i>	323

VOL. 43

FEBRUARY, 1956

Group Learning Through Group Discussion. <i>Maloney, R. M.</i>	3
Leadership and Group Dynamics. <i>Wolman, B.</i>	11

An Examination of the Process and Function of Social Stereotyping. <i>Fishman, J. A.</i> ..	27
The Adequacy of Written Problem Solving by Teams and by Individuals. <i>Large, I., et al.</i> ..	65
Cultural Differences in Serial Reproduction. <i>Talland, G. A.</i> ..	75
Developmental Aspects of Second-language Acquisition. I. <i>Lambert, W. E.</i> ..	83
Developmental Aspects of Second-language Acquisition. II. <i>Lambert, W. E.</i> ..	91
Developmental Aspects of Second-language Acquisition. III. <i>Lambert, W. E.</i> ..	99
Explorations in the Dynamic Processes of Stereotyping. <i>Vinacke, W. E.</i> ..	105
Intra-group Communication and Leader Choice. <i>Shaw, M. E., and Gilchrist, J. C.</i> ..	133
Mobility Anticipation, Class Assignment, and Authoritarianism as Field Determinants of Attitudes. <i>Cooper, J. B.</i> ..	139
The Quantification of Some Aspects of Social Psychology. <i>Winthrop, H.</i> ..	157
Group Belongingness Among Negroes. <i>Grossack, M. M.</i> ..	167

VOL. 2

NERV. CHILD.

JANUARY, 1956

Polio and Personality. <i>Seidenfeld, M. A.</i> ..	6
A Framework for the Psychopathology of Poliomyelitis. <i>Robinson, H. A., and Finesinger, J. E.</i> ..	10
Poliomyelitis. XIII. Pathology. <i>Baker, A. B.</i> ..	18
Body-Image Changes in Patients with Respiratory Poliomyelitis. <i>Glud, E., and Blane, H. T.</i> ..	25
The Parent of the Polio Child. <i>Bennett, R. L.</i> ..	47
Going to School in a Respirator Center. <i>Walton, M. H., and Long, N.</i> ..	53

VOL. 6

NEUROL.

APRIL, 1956

Hereditary Light Sensitive Epilepsy. <i>Davidson, S., and Watson, C. W.</i> ..	235
The Ramsay Hunt Syndrome. <i>Sachs, E., and House, R. K.</i> ..	262
Diffuse Glioma of the Brain in von Recklinghausen's Disease. <i>Scharenberg, K., and Jones, E.</i> ..	269
*Mescaline and LSD-25 in Activation of Temporal Lobe Epilepsy. <i>Schwarz, B. E., et al.</i> ..	275
Protracted Unconsciousness due to Closed Head Injury. <i>Jacobson, S. A.</i> ..	281
*Investigation of the Primate Amygdala. <i>Baldwin, M., et al.</i> ..	288

Mescaline and LSD-25 in Activation of Temporal Lobe Epilepsy

Mescaline and LSD-25, administered to three patients who had temporal lobe epilepsy, did not provoke psychic auras or any causally related material. The electroencephalographic changes were minimal and were associated with the action of mescaline and LSD-25, rather than as an activation of a focus.

(Authors' Abstr.)

Investigation of the Primate Amygdala: Movements of the Face and Jaws. 2. Effect of Selective Cortical Ablation

The authors have removed the cortical representations for face, lips, jaws, and tongue on both sides in different monkeys. After these cortical removals they obtained movements of face and jaws as they stimulated the amygdala on one or the other side. They have evoked ipsilateral facial movements and some movements of the jaws during stimulation of certain regions of the lateral temporal cortex. This has been the experience of Schneider and Crosby. However, they removed these areas of the lateral temporal cortex. In these animals stimulation of either amygdala was followed by movements of the face and jaws identical to those which they have described in animals whose cortical areas were intact.

(Authors' Abstr.)

MAY

Fatalities in Myasthenia Gravis. <i>Rowland, L. P., et al.</i> ..	307
Interseizure Disturbances in Focal Epilepsy. <i>Morrell, F.</i> ..	327
Analysis of Autonomic Hypothalamic Functions in the Intact Organism. <i>Gellhorn, E.</i> ..	335
Compression of Cervical Portion of the Spinal Cord. <i>Daniels, L. E.</i> ..	344
Pallidum and Muscle Tone. <i>Spiegel, E. A., et al.</i> ..	350
Petit Mal Status. <i>Friedlander, W. J., and Feinstein, G. H.</i> ..	357

VOL. 69

PISANI.

1955

A Histochemical Study of Nucleic Acids in Anterior Root Cells in the Spinal Medulla, etc. <i>Smorto, G., et al.</i> ..	3
Kunkel's Reaction in the CSF. <i>Papalia, A.</i> ..	31
Neurologic Signs in Barbiturate Psychoses. <i>Asaro, F.</i> ..	41
The Action of Chlorpromazine in Non-convulsive Dose on Anterior Root Cells, etc. <i>Smorto, G., et al.</i> ..	53
A Contribution to our Knowledge of the Process of Macroglial Amoeboidosis. <i>Smorto, G.</i> ..	59

Vitamin B6 in Place of Barbiturates in Treatment with Ganglioplegics. <i>Matarazzo, A.</i>	77
Reserpine in Psychiatry. <i>Pisani, D., et al.</i>	85
Beneficial Results on Deterioration after Treatment with Reserpine. <i>Pisani, D., et al.</i>	103
The Effect of Cocarboxylase and of Adenosinetriphosphoric Acid on the Phenomena of Insulin Hypersensitivity. <i>Grassano, C.</i>	115
The Treatment of Sitophobia with Sodium Amytal. <i>Rivas, M.</i>	169

VOL. 19

PSYCHIAT.

FEBRUARY, 1956

Elements of Psychotherapeutics with the Schizophrenic Child and his Parents. <i>Szurek, S. A., and Berlin, I. N.</i>	1
Charismatic Participation as a Sociopathic Process. <i>Lipman, M., and Pizzurro, S.</i>	11
The Psychodynamics of Vengefulness. <i>Searles, H. F.</i>	31
The Communication of Neurotic Patterns over Two and Three Generations. <i>Fisher, S., and Mendell, D.</i>	41
Personalities of First and Second Children. <i>McArthur, C.</i>	47
On Probability Theory and Psychoanalytic Research. <i>Chasson, J. B.</i>	55
Psychoanalytic Principles in a Mental Health Clinic for the Preschool Child and his Family. <i>Ackerman, N. W.</i>	63
Affective Symbolism, Social Norms and Mental Illness. <i>Cumming, J., and E.</i>	77
Conscious Reactions Associated with Neuropsychiatric Breakdown in Combat. <i>Rose, A. M.</i>	87

VOL. 30

PSYCHIAT. QUART.

JANUARY, 1956

Psychiatry, Science and Statistics. <i>Hopkins, C. E.</i>	1
A Preliminary Report on the Use of Chlorpromazine Hydrochloride in a Correctional Institution. <i>Addison, R.</i>	15
Chlorpromazine for Mental Illness in the Presence of Pulmonary Tuberculosis. <i>Pleasure, H.</i>	23
The Fate of One's Face. <i>Meerloo, J. A. M.</i>	31
Psychological Factors Associated with Disseminated Lupus Erythematosus and Effects of Cortisone and ACTH. <i>Brody, S.</i>	44
Some Psychic Interrelations Between the Urinary and the Sexual Systems with Special Reference to Enuresis. <i>Robertiello, R. C.</i>	61
Menstrual Disturbances During ECT. <i>Michael, S. T.</i>	63
Unconscious Reasons for Husband's "Confessions" to their Jealous Wives. <i>Bergler, E.</i>	73
Some Comments on the Nature, Diagnosis and Prognosis of Neurotic Anxiety. <i>Ausubel, D. P.</i>	77
The Use of Hyaluronidase with Insulin in Insulin Coma Therapy. <i>Alexander, S. P., and Neander, J. F.</i>	89
"Mobility" in Chronic Schizophrenia with Special Regard to Psychosurgery. <i>Crandell, A., et al.</i>	96
Psychotherapy of Phantom Limb Pain in Two Patients. <i>Blood, A. M.</i>	114
An Investigation of the Role Played by Oxygen and by Cellular Respiration in Hypoglycemic Coma. <i>Koroljow, S. A.</i>	123

APRIL

*Response of Psychiatric Patients to Massive Doses of Thorazine. I. <i>Rockmore, L., et al.</i>	189
Blood Pressure Studies in Schizophrenia. <i>Douglas, D. B., and Hoch, P. H.</i>	204
A Schizophrenic Patient Describes the Action of Intensive Psychotherapy. <i>Hayward, M. L., and Taylor, J. E.</i>	211
Experiences with Metrazol in Psychoses with Cerebral Arterio-sclerosis. <i>Tennent, J. J.</i>	249
Electric Stimulation and Insulin Coma. <i>Hirschfeld, G., et al.</i>	260
Suicide. <i>Hendin, H.</i>	267
A Follow-up Study of "Untreated" Patients with Various Behavior Disorders. <i>Saslow, G., and Peters, A. D.</i>	283
The Relationship Between Delusional Thinking and Hostility. <i>Cohen, F.</i>	303

Response of Psychiatric Patients to Massive Doses of Thorazine. I. Behavioral and Clinical Analysis

The following results were obtained:

1. Change in Status Following Thorazine. (a) Objective behavioral ratings: The mean score for the group increased significantly from pre-treatment to mid-treatment to post-treatment ratings. Significant improvement occurred over the entire course of treatment ($P < .001$). (b) Clinical ratings: Significance tests (t-tests, chi-square tests) indicated definite improvement in psychiatric status as measured by the clinical rating scale of change in status. In no case did a patient's behavior deteriorate. (c) Specific behavioral areas improved: The 100 items of the objective behavioral rating scale were submitted to individual item analysis under the hypothesis that change would occur in the direction of greater mental health following thorazine. Twenty-seven items showed significant shift in this direction with

thorazine treatment. Qualitative and quantitative evaluation indicated that this group of items was highly saturated with statements concerning increase in overt activity and in communication and socialization. This was of special interest, since other studies have tended to indicate that thorazine is most useful for calming patients who are excessively excited or overactive.

2. Physiological Cues to the Outcome of Treatment. Several physiological measures were subjected to analysis in an attempt to derive cues early in treatment, which might presage ultimate behavioral and psychiatric improvement. None of the several measures studied were significantly related to improvement. However, a measure of pulse rate variability during the first two days of treatment showed a tendency toward an inverse relationship to ultimate improvement following thorazine ($P=.10$).

3. Relationship Between Improvement and Age or Chronicity. (a) Improvement and age: A comparison of the oldest with the youngest patients gave no reason to reject the null hypothesis that age was unrelated to the results of thorazine treatment as administered by the procedure employed. (b) Improvement and Chronicity: Similarly, significance tests gave no reason to reject the null hypothesis that behavioral improvement over the course of thorazine was unrelated to chronicity of the mental illness.

The over-all findings point to definite psychiatric and behavioral improvement in the patients studied, following a course of massive thorazine treatment.

(Authors' Abstr.)

VOL. 25 PSYCHOANAL. QUART. APRIL, 1956

Freud's One Hundredth Anniversary. <i>Zilboorg, G.</i>	139
Four Unpublished Letters. <i>Freud, S.</i>	147
A Re-examination of "Studies in Hysteria". <i>Reichard, S.</i>	155
Two Forms of Regression and their Therapeutic Implications. <i>Alexander, F.</i>	178
Schopenhauer and Freud. <i>Procter-Gregg, N.</i>	197
The <i>Déjà Raconté</i> : A Transference-Delusion Concerning the Castration Complex. <i>Fliess, R.</i>	215
On Earliest Memories. <i>Saul, L. J.</i>	228
The Marriage Bond. <i>Stein, M. H.</i>	238

VOL. 18 PSYCHOSOM. MED. MARCH-APRIL, 1956

Creation of a Multidisciplinary Team. <i>Ruesch, J.</i>	105
Evaluation of Results of Psychotherapy. <i>Rosenbaum, M., et al.</i>	113
Psychological Significance of Visual Auras. <i>Beck, A. T., and Guthrie, T.</i>	133
Further Appraisal of the Adrenalin-Mecholyl Test. <i>Pasquarelli, B., et al.</i>	143
Process in Psychosomatic Disorders. <i>Greene, W. A., jun.</i>	150
Urinary Excretion of Formaldehydogenic Steroids and Creatinine. <i>Schwartz, T. B., and Shields, D. R.</i>	159

VOL. 8 Q. J. EX. PSYCHOL. MAY, 1956

Some Factors Affecting Response in Recognition Tests. <i>Belbin, E., and Cane, V. R.</i>	45
Some Effects of Thiamine Deficiency and Reduced Caloric Intake on "Behaviour Under Stress" and on Learning. <i>Knopfmacher, F., et al.</i>	54
Experimental Determinations of Luneberg's Constants σ and κ . <i>Zajackowska, A.</i>	66
"Handedness" and Skill. <i>Provins, K. A.</i>	79

VOL. 17 Q. J. STUD. ALC. MARCH, 1956

Estimation of the Level of Blood Alcohol from Analysis of Breath. <i>Harger, R. N., et al.</i>	1
Miltown as a Tranquilizer in the Treatment of Alcohol Addicts. <i>Thimann, J., and Gauthier, J. W.</i>	19
Pagitane in the Treatment of Alcoholism. <i>Craig, R. D.</i>	24
The Treatment of Delirium Tremens. <i>Berman, L. H.</i>	28
A Rorschach Study of 67 Alcoholics. <i>Button, A. D.</i>	35
Ritual Drinking, Ethnic Status and Inebriety in Rural Colombia. <i>Sayres, W. O.</i>	53
Alcoholism in the Big Cities of the United States. <i>Keller, M., and Efron, V.</i>	63
Supervision of the Problem Drinker on Probation. <i>Asher, R. W.</i>	73
A Technique for the Initial Interview with Male Alcoholics. <i>Clifton, C. S.</i>	89
Alcoholism as a Disorder of the Love Disposition. <i>Lolli, G.</i>	96
Alcohol, Self and the Group. <i>Washbourne, C.</i>	108

VOL. 44 RASS. STUDI. PSICHIAT. 1955

The Impulsive Fugue. <i>Moreno, M., and Pasetti, A.</i>	559
Myoclonic Epilepsy. <i>Fattovich, G.</i>	587
Modifications in the Oscillographic Arterial Curve in Mental Patients after Different Pharmacological Stimuli. <i>Biasci, L., and Ronco, P.</i>	606
Basal Derivation in Temporal Epilepsy. <i>Zappoli, R., and Schergna, E.</i>	625

Electrophoretic Study on the CSF and Blood in Patients with Cerebral Syphilis.	
<i>Biagini, R., and Radicchi, M.</i>	674
The Nosological Problem in Puerperal Psychoses. <i>Callieri, B.</i>	769
Korsakoff's Syndrome. <i>Rizzo, E. M.</i>	801
A Clinical and EEG Study of a Case of Reflex Epilepsy. <i>Gentili, C.</i>	817
The Psychology of the Alcoholic. <i>Sagripanti, P.</i>	827
Acetylcholine and Schizophrenia. <i>Catagni, F.</i>	842
VOL. 45	1956
A Psychopathological and Clinical Contribution to the Study of the Relation Between Schizophrenia and Epileptic Psychoses. <i>Callieri, B., and Semerari, B.</i>	3
Cerebral Metabolism During Pentothal Anaesthesia. <i>Belucci, G., and Romerio, C.</i>	46
Considerations on Some Aspects of EEG in Acute Intracranial Vascular Syndromes. <i>Montanari, M., and Romerio, C.</i>	57
A Contribution to Knowledge of the Somatic Correlations in Anxiety States. <i>Mistri, M., and Palazzuoli, M.</i>	92
Recent Points of View on Tuberosc Sclerosis. <i>Ghisoni, T., and Taverna, P.</i>	99
Consideration on a Case of Chronic Delusional Insanity. <i>Sacerdoti, G.</i>	130
VOL. 3	REV. ALCOOL.
	1955
Arterial Hypertension in Alcoholics. <i>Dardenne, P.</i>	285
Alcoholic Cirrhosis of the Liver. <i>Vesin, P., et al.</i>	288
VOL. 4	1956
Alcoholism and Sexuality. <i>Perrin, P.</i>	9
Endocrine Trouble in Alcoholics. <i>Merle, M.</i>	12
VOL. 93	REV. NEUROL.
	1955
A Special Anatomic Type of Syphilis of the Neuraxis. <i>Guillain, G., et al.</i>	517
The Arnold-Chiari Syndrome. <i>Sandbank, U.</i>	529
Forty Cases of Werdnig-Hoffman's Disease with Eleven Anatomical Examinations. <i>Thieffry, S., et al.</i>	622
Meningo-cerebellar Gliosis and von Recklinghausen's Disease. <i>de Ajuriaguerra, J., et al.</i>	645
A Case of Marchiafava-Bignani's Disease Associated with a Chronic Carbon-monoxide Poisoning. <i>Haguenan, J., et al.</i>	656
Encephalitis in Children. <i>Solé-Sagarra, J.</i>	669
Sciatic Paralysis. <i>Guillaume, J., et al.</i>	685
An Anatomico-clinical, Biological and Chemical Study of a Case of Pseudo-sclerosis of Westphal-Strumpell. <i>Alajouanine, T., et al.</i>	701
Hypothalamic Stupor from Diencephalic-Hypophyseal Hydatid. <i>Brage, D., et al.</i>	730
Thyroid Upset from Cranial Injury. <i>Lafon, R., et al.</i>	805
New Microscopic Aspects of Nerve Tissue Furnished by Silver-Impregnation Technique at the Institute of Anatomy of Geneva. <i>Weber, A.</i>	817
VOL. 75	RIV. PAT. NERV. MENT.
	1955
Sixty-four Cases of Spinal Tumours Operated On. <i>Guidetti, B., and Carloni, G.</i>	679
Neologism and Neological Language. <i>Cossis, M.</i>	713
Researches on Behaviour after Inoculation with Gonadotrophic Hormones in Rats. <i>Bozzi, R., and de Sanctis, T.</i>	774
Hepatic Function and Cutaneous Reaction to Estrogens in Schizophrenics with Hyperestrogenism. <i>Sacerdoti, G., and Carrai, E.</i>	781
The Influence of Treatment with Cerebral Lipoids on the Consumption of Oxygen in the Cerebral Cortex in Rats. <i>Gazzarrini, A., and Beletto, D.</i>	791
An Experimental Contribution to the Study of Extrapyramidal Mechanisms in the Pathogenesis of Chorea-athetotic Movements. <i>Francesco, F. M.</i>	798
First Results in the Study of Cerebral Blood-flow, Oxygen Intake and Cerebral Vascular Resistance in Epileptics. <i>Romerio, C., and Montanari, M.</i>	804
Largactil in the Cure of Schizophrenia. <i>Bonetti, U., and Pedrinoni, L.</i>	815
The Optic Thalamus. <i>Maghernu, G.</i>	829
The Neurological and Psychiatric Picture in Puerperal States. <i>Luzzatto, A.</i>	856
Blood Groups Related to the Cause of Mental Deficiency. <i>Luzzatto, A.</i>	961
Cerebral Atrophy. <i>Romolo, R., et al.</i>	999
Surgical Treatment in the Field of Nervous and Mental Disease. <i>Ambrosetto, C.</i>	1094

INDEX TO VOLUME 102

The General Index covers original articles, reviews and the epitome.

The following names are printed in SMALL CAPITALS: Authors of original articles and of books reviewed. Names of authorities referred to in the text are in ordinary type.

(R.) indicates a *Review*; the title of the book reviewed is followed by the author's name.

(E.) indicates the *Epitome* section; the title of the epitome is followed by the author's name.

The names of authors referred to in the Epitome are listed in Part II.

PART I.—GENERAL INDEX

- Acetylcholine as a therapeutic agent in mild psychiatric disorders, by C. W. B. Pare, 847
 „ content of the middle hypothalamus in rats, influence of exogenous hormones on the. Gitsch, E., and Reitingen, J. (E.), 658
 „ effects of, on phosphate turnover in phospholipides of brain cortex in vitro. Hokin, L. E. and M. R. (E.), 400
 „ formation of, from S-acetylthiamine. Ito, S. (E.), 402
 „ metabolism, IV and V. Nakata, F. (E.), 656
 „ -like action of brain extracts. Schumann, H. J. (E.), 403
 „ therapy in neurosis, intravenous, by J. R. Hawkins and R. W. Tibbetts, 43
 Adolescence, the psychoses of, by the late Dalton E. Sands, 308
 Adrenal function, significance of, in carbohydrate metabolism in nervous disease. Schmidt, R. M., and Schliecker, W. (E.), 399
 Adrenaline substance of the brain and suprarenals under increased oxygen pressure. Gershenovich, Z. S., *et al.* (E.), 403
 Adrenocorticotropin, effect of, on some aspects of brain metabolism and EEG. Torda, C. (E.), 205
 Ageing, research prospects in the psychology of, by D. B. Bromley, 272
 Agnosia, the problem of, in the light of a case of pure word deafness, by R. Klein and J. Harper, 112
 Alcoholism, new chemotherapeutics for. Delay, J., *et al.* (E.), 665
 Amino acid metabolism and Wilson's disease. Chessa-Perle, E., and Careddu, P. (E.), 399
 Ammonia, formation of, in brain tissue and adenylic acid deaminase. Tsukada, Y., and Takagaki, G. (E.), 202
 Amygdala, investigation of the primate. Baldwin, M., *et al.* (E.), 893
 Amygdaloid nucleus in the cat, electrophysiological studies on the connections of the. Gloor, P. (E.), 192
 „ „ stimulation of, in a schizophrenic patient. Heath, R. G., *et al.* (E.), 181
 Antabuse and alkozol, the influence of, on the blood alcohol level. Portheine, F. (E.), 665
 „ ethanol metabolism and the action of. Fujiwara, E. (E.), 665
 Anticonvulsant SKF No. 2599, clinical trial of a new. Millichap, J. G., *et al.* (E.), 392
 Anxiety and cerebral excitability. Jeans, R. F., and Toman, J. E. P. (E.), 871
 Aphasia, diagnosis and prognosis in. Schnell, H. (E.), 374
 ARDIS, J. A., and McKellar, P., Hypnagogic imagery and mescaline, 22
 Area postrema and the allied structures of the mammalian brain, histochemical studies of glycogen of the. Shimizu, N. (E.), 196
 Asthma, by J. Bostock, 559
 Autonomic nervous center, effect of stimulation of the, upon the thiamine metabolism in rabbit. Satoyoshi, E. (E.), 402
 Azacynolol, chlorpromazine and reserpine, clinical evaluation of, on a group of chronic psychotic patients. Rinaldi, F. (E.), 632
- BAKER, A. A., and THORPE, J. G., A research method to assess a new tranquillising drug, 790
 „ „ „ Deteriorated psychotic patients, 780
 „ „ „ Some simple measures of schizophrenic deterioration, 838
 Ballism associated with partial destruction of the subthalamic nucleus of Luys. Carpenter, M. B. (E.), 200
 Barbiturate intoxication, action of succinic acid in. Kohler, D., and Barbe, M. (E.), 667
 „ „ the value of barbiturate estimation in the diagnosis and treatment of. Wright, J. T. (E.), 408
 „ poisoning, acute and chronic. Malmros, H., *et al.* (E.), 408
 Barbiturates, effect of, on latent motor deficits. Teng, P., and Bender, M. B. (E.), 393

- BARR, A., Migration and Mental Disease, 627
- Basal ganglia, an experimental study of pathways from the. Laursen, A. M. (E.), 195
- BATCHELDOR, K. J., and ROBERTSON, J. P. S., Cultural aspects of the Wechsler adult intelligence scale in relation to British mental patients, 612
- Bell's palsy, treatment of, with cortisone and other measures. Thomas, M. H. (E.), 648
- BENNETT, D. H., Perception of the upright in relation to body image, 487
- Beriberi toxin. I. Matsuda, S. (E.), 203
- Berkeley's Philosophy, the Unconscious Origin of, by J. H. Wisdom. Review by C. E. H. Turner, 625
- BERRINGTON, W. P., LIDDELL, D. W., and FOULDS, G. A., A re-evaluation of the fugue, 280
- Blood-brain barrier, the. Goldsworthy, P. D., *et al.* (E.), 206
- BLUM, R. H., Photic stimulation, imagery, and alpha rhythm, 160
- Body image, perception of the upright in relation to, by D. H. Bennett, 487
- BOSTOCK, J., Asthma, 559
- BRACHA, S., and HES, J. PH., The influence of reserpine on a disturbed male ward and a method for assessing this, 546
- Brain, anaerobic inhibition and reactivation of glycolysis in the. Lenti, C., and Bargoni, N. (E.), 661
- „ of animals under conditions of block and stimulation, content of water and residual nitrogen in the. Manoilova, O. S., and Bakulina, N. D. (E.), 653
- „ barrier, mesomucinase and. Ferrannini, A., and Mongelli Sciannameo, N. (E.), 653
- „ behaviour of rabbit, in ischemia and anoxia after adaptation to altitude. Opitz, E., and Kreuzer, F. (E.), 660
- „ carbohydrate metabolism of normal. Prokhorova, M. I. (E.), 655
- „ chemical constituents of human. Himwich, W. A., *et al.* (E.), 886
- „ cortex and parathyroid gland, the interrelationship between functional states of. Baranova, N. F. (E.), 404
- „ „ in vitro, metabolism of human. Sutherland, V. C., *et al.* (E.), 400
- „ damaged children, a characteristic form of overactive behaviour in, by T. T. S. Ingram, 550
- „ disease, carbohydrate metabolism in. IV. Henneman, D. H. (E.), 204
- „ „ carbohydrate metabolism. V. Henneman, D. H., *et al.* (E.), 654
- „ distribution of substance P and choline acetylase in the. Zetler, G., and Schlosser, L. (E.), 205
- „ during tuberculosis, enzymic processes in. Platonov, E. G. (E.), 402
- „ effect of diisopropyl fluorophosphate on the energy-rich phosphates and ribose of the. Pscheidt, G. R., and Michaelis, M. (E.), 401
- „ the effect of glutamic acid upon the phosphorus compounds of. Ivanov, V. I., and Rozenberg, P. A. (E.), 669
- „ effect of hexamethonium chloride or the bioelectric activity of the dog. Imbriano, A. E., *et al.* (E.), 400
- „ glycolysis in the. Lenti, C., and Bargoni, N. (E.), 661
- „ glycerophosphatides, the constitution of the highly unsaturated C₂₀ and C₂₂ Fatty Acids of. Klenk, E., and Bongard, W. (E.), 659
- „ homogenate, metabolism of nucleoside and nucleotide purines in. Orunesu, M., *et al.* (E.), 661
- „ injury, an evaluation of the Rorschach method for the study of. Hertz, M. R. (E.), 647
- „ „ in man, effect of unilateral on learning of a tactual discrimination. Ghent, L., *et al.* (E.), 882
- „ „ studies of cerebral circulation in. III. Meyer, J. S. (E.), 641
- „ integration of the bioelectric activity of the, in relation to compensating oscillograms in man. Schminke, G. A. (E.), 205
- „ lesions affect normal and neurotic behaviour. how. Masserman, J. H., and Pechtel, C. (E.), 868
- „ lipide fractions, action of thromboplastinase on human. Feldman, D., and Ginell, R. (E.), 656
- „ „ human, at various ages in relation to myelination, by A. H. Tingey, 851
- „ and liver in hepatic encephalopathy, the copper content of. Porter, H., and Adams, R. D. (E.), 646
- „ metabolism, inositol in. Kerken, H., and Maibauer, D. (E.), 205
- „ pathologic, neurologic techniques and Rorschach test in detecting. Fisher, J., and Gonda, T. A. (E.), 372
- „ pentosenucleic acid, composition of, in normal and poliomyelitis virus-infected mice. Siegel, B. V., and Kuusi, T. K. (E.), 658
- „ pharmacological studies on the phosphorus metabolism of, with radioactive phosphorus-32. Takenaka, F., *et al.* (E.), 407
- „ potassium, depression in, in ovine pregnancy toxemia. Setchell, B. P., and McClymont, G. L. (E.), 662
- „ preliminary studies on the hormone of the. L'Helias, C. (E.), 656

- Brain, the quantitative determination of some metals in the human. Dorfman, S. I., and Shipitsyn, S. A. (E.), 652
- " " " " histochemistry of. Strominger, J. L., and Lowry, O. H. (E.), 403
- " of rabbit, study of the rate of exchange of phosphorus in the. Smirnov, A. A., and Chetverikov, D. A. (E.), 652
- " Sir W. Russell Thirtieth Maudsley Lecture, Perception and imperception, 221
- " slices, effect of potassium ions on. Tsukada, Y., and Takagaki, G. (E.), 657
- " " the mechanism of the potassium loss from, by cholinesterase inhibitors. Strickland, K. P., and Thompson, R. H. S. (E.), 662
- " suspensions, influence of bicarbonate ions on the glycolysis of. Keller, H. (E.), 203
- " tissue, ammonia formation and glutamic acid in. Takagaki, G. (E.), 651
- " " of animals, the state of cholesterol and phospholipides in the. Nedzvetskii, S. V., and Ratnitskaya, S. S. (E.), 202
- " " in the chick, phosphorylation in. Gordon, O. M. (E.), 651
- " " correlations between drug action and specific cholinesterase activity of. Tagaki, H. (E.), 666
- " " inhibitory effect of malonate on the respiration of, with special reference to the potassium effect. Kimura, Y., and Niwa, T. (E.), 205
- " wave of cats, influence of several kinds of anesthetic upon the. Muramatsu, M. (E.), 669
- Bromide intoxication. Campbell, J. D. (E.), 408
- BROMLEY, D. B., Research problems in the psychology of ageing, 272
- Caffeine, changes in spinal reflexes in man after oral administration of a moderate dose of. Gualtierotti, T., and Margario, R. (E.), 667
- " variations in the frog's spinal reflexes caused by the action on the brain of large doses of. Gualtierotti, T. (E.), 668
- CAMERON, K., Past and present trends in child psychiatry, 599
- Camphor, action of, on the synapses in the motor and autonomic system. Rohr, H. (E.), 206
- Carbon dioxide and convulsants, mutual action of. Langnickel, D., *et al.* (E.), 406
- " inhalation therapy in neurosis, by J. R. Hawkins and R. W. Tibbetts, 52
- Catatonia, physiological concomitants of the phasic disturbances seen in periodic. Bonkato, A., *et al.* (E.), 369
- Catatonic schizophrenic patients, an attempt to demonstrate a catatonigenic agent in CSF of. Shapiro, A. K. (E.), 889
- Cathartic process I, a contribution to the objective measurement of the, by F. Goldman-Eisler, 78
- CAWTE, J. E., A note on the future of phenylketonuria, 805
- Central nervous system and thyroid gland of the hypophysectomized cat, the iodine content of the. Tutaev, G. V., and Isichenko, N. A. (E.), 204
- " " " of cats after thyroidectomy, iodine content of the. Tutaev, G. V., and Isichenko, N. A. (E.), 203
- CNS, action of some phenothiazine derivatives on the. Balestrieri, A., and Fadiga, E. (E.), 664
- " alteration of the activity of, during phosphorus poisoning in animals. Krasnov, S. K. (E.), 400
- " effect on the, of intravenously injected procaine. Karerina, N. V., and Khayutin, V. M. (E.), 668
- " nadi reaction in the substance of the. Mitolo, M., and Ruccia, D. (E.), 660
- " the effect of alcohol on the. Victor, M., and Adams, R. D. (E.), 398
- " effects of bacterial toxins on the. Gammon, G. D. (E.), 398
- " " " heavy metals on the. Aring, C. D., and Trafant, C. A. (E.), 398
- " " " the organic solvents and industrial poisonings on the. Baker, A. B., and Tichy, F. Y. (E.), 398
- " " " xylocaine on the, with special reference to its influence on epileptic phenomena. Bernhard, C. G., and Bohm, E. (E.), 405
- " " presence of different fractions of true combined creatine in the. Mitolo, M., *et al.* (E.), 652
- " " presence of mucopolysaccharides in the. Benassi, G. (E.), 652
- " " "protein profile" in disorders of the. Volk, B. W., *et al.* (E.), 871
- " " toxic and metabolic effects of general anaesthetic agents on the. Dripps, R. D. (E.), 398
- Cephalic post-traumatic syndrome, the, by A. A. McConnell, 330
- Cerebellar agenesis, by R. M. Stewart, 67
- Cerebellum, functional localization in the. Chambers, W. W., and Sprague, J. M. (E.), 634
- " specific changes in the, in chronic mercuric chloride poisoning. Enders, A., and Noetzel, H. (E.), 653
- Cerebral anoxia, case studies in. X. Courville, C. B. (E.), 637

- Cerebral arteries, arteriosclerotic occlusion of. Bruetsch, W. L. (E.), 654
- „ circulation and metabolism of normal young men, the effects of sleep and lack of sleep on the. Manfold, R., *et al.* (E.), 659
- „ „ „ „ the effect of mental arithmetic on. Sokoloff, L., *et al.* (E.), 659
- „ „ studies in, I and II. Meyer, J. S., and Denny-Brown, D. (E.), 511 and 529
- „ cortex of the cat, action of acetylcholine, eserine and atropine on the isolated gyrus of the. Infantellina, F. (E.), 661
- „ „ and medulla oblongata, sodium succinate in pentobarbital depression of the. Larson, E., *et al.* (E.), 408
- „ „ a mucopolysaccharide from human. Ejima, T. (E.), 659
- „ „ intralaminar distribution of cytochrome oxidase and DPN, in rat. Pope, A., *et al.* (E.), 891
- „ „ organization of the. Brody, H. (E.), 196
- „ „ stimulation of secretion of oxytocin by the hypothalamus by the application of adrenalin to the. Chamorro, A., and Minz, B. (E.), 657
- „ cysticercosis with mental symptoms, by J. M. Sutherland and J. M. Rosie, 343
- „ disease, language disturbances in. Pichot, P. (E.), 187
- „ electrographic changes induced by LSD and mescaline are corrected by frenquel. Rinaldi, F., and Himwich, H. E. (E.), 886
- „ function, studies in human. Berlin, L., *et al.* (E.), 886
- „ „ and circulation, effect of controlled hypotension on. Saunders, J. W. (E.), 658
- „ hemodynamics and metabolism, the influence of shock on. Fazekas, J. F., *et al.* (E.), 400
- „ lesions, electrolyte disturbances in. Anthonisen, P., *et al.* (E.), 402
- „ „ mental changes as a presenting feature in subcortical, by C. W. M. Whitty, 719
- „ vessels, effectiveness of β -pyridyl carbinol on. Gross, H., and Hackl, H. (E.), 668
- Cerebrospinal fluid, calcium and magnesium in the. Harris, W. H., and Sonnenblick, E. H. (E.), 655
- CSF, a study of free amino acids in the human. Logothetis, J. (E.), 393
- „ caramelization test. Solé, A. (E.), 655
- „ cholinesterase activity of. Jefferson, M. (E.), 657
- „ concentration of, for preparation of electropherograms. Pruckner, G., and Schwuttke, G. (E.), 404
- „ electrophoresis of proteins in the. Booij, J. (E.), 404
- „ following oral administration of cortisone acetate or hydrocortisone. Abelson, D., *et al.* (E.), 655
- „ influence of the potassium concentration of the blood on the potassium level of the. Bekaert, J., and Demeester, G. (E.), 405
- „ mucoproteins in normal and pathological. Ferrante, L., and Cantarutti, F. (E.), 405
- „ of human beings, densities of the. Davis, H., and King, W. (E.), 404
- „ „ the newborn, the. Woiski, J. R., *et al.* (E.), 404
- „ „ the effect of age on the protein concentration, etc. Muller, O., *et al.* (E.), 405
- „ „ plasmalogen content of. Stammli, A. (E.), 405
- Cerebrum, dog, the distribution of phosphomonoesterases and pyrophosphatase in the particulate fractions of. Waked, N., and Kerr, S. E. (E.), 401
- Child psychiatry, facts and fictions in the study of, by E. Miller, 96
- „ „ past and present trends in child psychiatry, by K. Cameron, 599
- CHISHOLM-BATTEN, W. R., CROTTY, I. M., and HOENIG, J., Hibicon, 105
- Chlorpromazine, action of, on the CNS. Dasgupta, S. R., *et al.* (E.), 664
- „ changes in behaviour and EEG in rhesus monkeys caused by. Das, N. N., *et al.* (E.), 206
- „ and the adrenaline-secretory centers. Donnet, V., *et al.* (E.), 663
- „ „ „ „ autonomic nervous system. Jourdan, F., *et al.* (E.), 663
- „ in dogs, dual mechanism of antiemetic action of. Glaviano, V. V., and Wang, S. C. (E.), 663
- „ determination of, in different tissues. Gouzon, B., *et al.* (E.), 663
- „ effect of, on the human EEG and electrodermogram. Turner, M., and Bérard, E. (E.), 663
- „ „ „ „ phosphorylation of brain mitochondria. Abood, L. G. (E.), 408
- „ „ „ „ electric activity of the *cerveau isolé*. Das, N. N., *et al.* (E.), 207
- „ laboratory and clinical observations on. Moyer, J. H., *et al.* (E.), 206
- „ in the management of acute alcoholic states. Schultz, J. D., *et al.* (E.), 202
- „ and human spasticity. Basmajian, J. V., and Szatmari, A. (E.), 648

- Chlorpromazine, oxygen consumption, blood supply and vulnerability of the brain of warm-blooded animals under the influence of. Frowein, R. A., *et al.* (E.), 663
- „ the relation of, to epilepsy. Meszaros, A. F., and O'Reilly, P. O. (E.), 876
- „ reserpine, phenobarbital and a placebo, a comparative study of the effect on anxiety of. Rosner, H., *et al.* (E.), 887
- „ and reserpine, a comparison of, in chronic psychoses. Kovitz, B., *et al.* (E.), 633
- „ „ „ „ Parkinsonian reactions following. May, R. H., and Voegelé, G. E. (E.), 871
- „ treatment of mental disorders. Kinross-Wright, V. (E.), 182
- „ „ „ „ disturbed epileptic patients. Bonafede, V. I. (E.), 372
- „ as a therapeutic agent in clinical medicine. Moyer, J., *et al.* (E.), 206
- „ in the treatment of schizophrenia. Kurland, A. A. (E.), 387
- „ „ „ „ „ the chronically disturbed schizophrenic patient, by P. H. Mitchell, 151
- Choline in C.S.F., definite identification of, with dipicrylamine, etc. Ackermann, R. and D. (E.), 654
- Cholinesterase activity in several rabbit brain areas, relation between age and. Aprison, M. H., and Himwich, H. E. (E.), 204
- „ histochemistry of. II. Toyota, M. (E.), 655
- Chronic mental illness, clinical comparison of raudixin and rau-sed in. Holt, E. K. (E.), 191
- Coccarboxylase and the excitability of the nerve centers. Di Stefano, E., and Previtera, L. (E.), 652
- Colour-form response as a function of mental disorder, by J. D. Keehn and A. Sabbagh, 319
- Communication, the psychophysics of. Lovett Doust, J. W., and Coleman, L. I. M. (E.), 634
- Conditioned reflexes in dogs, effect of niacin avitaminosis on. Efremov, V. V., *et al.* (E.), 657
- Consciousness, the cingulate gyrus in relation to. Kennard, M. A. (E.), 385
- Convulsant, the intracellular distribution of a fluorescent. Steven, E., and Bain, J. A. (E.), 406
- Convulsive state, the relation between adrenal cortical activity and the. Glaser, G. H. (E.), 402
- Copper and amino acid metabolism, disturbances in, in hepatocerebral degeneration and their treatment with BAL. Steger, J. and R. (E.), 399
- Cortex of the cerebrum in dogs during sleep and wakefulness, phosphorus metabolism in the. Smirnov, A. A. (E.), 652
- Cortical bioelectric changes in human beings produced by hexamethonium chloride. Imbriano, A. E., *et al.* (E.), 406
- „ and cerebral convulsions caused by bile and bile salts. Takeda, T. (E.), 203
- COSTELLO, C. G., The effects of prefrontal leucotomy upon visual imagery and the ability to perform complex operations, 507
- County register of houses for the reception of "Lunatics", 1798-1812, by R. A. Hunter, I. Macalpine and L. M. Payne, 856
- Crime and *folie à deux*, by H. P. Greenberg, 772
- Criminal act and punishment, the psychology of the, by G. Zilboorg, review by J. Gould (R.), 365
- CROCKET, B. M., DAWSON, J. and HULLIN, R. P., Metabolic variations in manic-depressive psychosis, 168
- CROTTY, I. M., CHISHOLM-BATTEN, W. R., and HOENIG, J., Hibicon, 105
- DAWSON, J., HULLIN, R. P., and CROCKET, B. M., Metabolic variations in manic-depressive psychosis, 168
- „ M. E., *et al.*, An investigation into children in an attempt to differentiate between mental defect and deafness, 121
- Dementia, the association of, with radiologically demonstrated cerebral atrophy. Gosling, R. H. (E.), 197
- Depression, the treatment of, with methylamphetamine, by G. de M. Rudolf, 358
- Depressive reactions associated with temporal lobe uncinate seizures. Weil, A. A. (E.), 643
- Deteriorated psychotic patients, by A. A. Baker and J. G. Thorpe, 780
- Diencephalon and carbohydrate metabolism, relation between. Fedeli, S., *et al.* (E.), 660
- Dilantin, effects of, on adrenal cortical function. Costa, P. J., *et al.* (E.), 187
- Diplatin, effects of, on nerve transmission in various parts of the reflex path. Val'dman, A. V., *et al.* (E.), 670
- Disorientation, varieties of, by Max Levin, 619
- Dormiphen, applicability of, for sleep therapy from the pharmacological point of view. Sobek, V. (E.), 207
- "The Dry Drunk," the psychodynamics of. Flaherty, J. A., *et al.* (E.), 630

- DUNNE, J., The contribution of the physical sciences to psychological medicine, 209
- Dynamic Psychiatry, the Practice of, by J. H. Masserman, reviewed by I. Skottowe (R.), 864
- Dysautonomia, the neuropsychiatric aspects of familial, by W. Forster, and M. Tyndel, 345
- ECS, a further study on the retroactive effect of. Thompson, R., and Dean, W. (E.), 882
- ECT, the neurological basis of memory defects following. Fabing, H. D. (E.), 385
- „ „ use of in psychiatric syndromes complicating pregnancy, by S. Smith, 796
- EEG changes in man correlated with blood alcohol concentration, etc. Holmberg, G., and Martens, S. (E.), 395
- „ effects of drugs on the. Isenschmid, R. (E.), 669
- „ findings in old age, and their relationship to affective disorder, by R. Maggs and E. C. Turton, 812
- „ in phenylpyruvic oligophrenia, the. Fois, A., *et al.* (E.), 640
- „ „ forensic alcoholism. Marinacci, A. A. (E.), 637
- „ „ psychiatry, clinical applications of, by Denis Hill, 264
- „ of psychomotor seizures in childhood, the. Glaser, G. H., and Golub, L. M. (E.), 379
- „ rhythms from the depths of the parietal, occipital and temporal lobes in man. Sem-Jacobsen, C. W., *et al.* (E.), 877
- Elderly, prognosis in psychiatric disorders of the, by D. W. K. Kay, V. Norris, and F. Post, 129
- Electric activity of the cerebral cortex, effects of strychnine application to the ansiform lobule on the. Canestrari, R., *et al.* (E.), 653
- „ shock, the content of acid-soluble pentoses in the entire brain of guinea-pigs treated with. Fazio, C., *et al.* (E.), 666
- „ „ effect of, on some experimental blood-sugar curves. Isaji, M. (E.), 666
- Electroshock, blood cholesterol in. Lippi, M., and Argiolas, N. (E.), 666
- „ histaminase activity of serum in individuals subjected to. Prassoli, A. (E.), 666
- Emotional stress, reaction of the adrenal cortex to. Bliss, E. L., *et al.* (E.), 650
- Encephalitis periaxialis diffusa with survival for thirty-six years, by R. M. Stewart, 287
- Encyclopedie medico-chirurgicale, by H. Ey, reviewed by A. Lewis (R.), 364
- Enzyme concentrations in the brain and adjustive behavior patterns. Krech, D., *et al.* (E.), 205
- Epilepsy, emotional and psychological factors in. Liberson, W. T. (E.), 369
- „ experimental subcortical. Faeth, W. H., *et al.* (E.), 871
- „ treatment of, with cation exchanges. Mertens, H. G., *et al.* (E.), 207
- Epinephrine-mecholyl test (Funkenstein Test). Alexander, L. (E.), 185
- Ergot, combined hydrogenated alkaloids of, in mental and nervous disorders associated with old age. Hollister, L. E. (E.), 378
- Ethyl alcohol habituation, production of. Fujita, F. (E.), 654
- EVANS, M. J., *et al.*, An investigation into children in an attempt to differentiate between mental defect and deafness, 121
- Experimental psychiatry. II. Rinkel, M., *et al.* (E.), 182
- EYSENCK, S. B. G., Neurosis and psychosis, 517
- FERGUSON, R. S., A clinical trial of reserpine in the treatment of anxiety, 30
- „ Influences of reserpine on ECT, 826
- FISCHER, E., Reserpine in mental deficiency practice, 542
- Flexin, a longacting spinal cord depressant. Kamino, K., and Koell, G. B. (E.), 408
- Fluoracetate and fluorbutyrate convulsions in the isolated cerebral cortex of the dog. Hendershot, L. C., and Chenoweth, M. B. (E.), 399
- FORSTER, M., and TYNDEL, M., The neuropsychiatric aspects of familial dysautonomia, 345
- FOULDS, G. A., LIDDELL, D. W., and BERRINGTON, W. P., A re-evaluation of the fugue, 280
- Frenquel. Proctor, R. C., and Odland, T. (E.), 639
- „ in clinical and experimental psychoses, a year's experience with. Fabing, H. D., Hawkins, J. R. (E.), 637
- „ the use of, in the treatment of disturbed patients with psychoses of long standing. Rinaldi, F., *et al.* (E.), 371
- Frontal granular cortex of monkey, immediate and chronic disturbances on the delayed response following transection of. Orbach, J. (E.), 883
- „ lesions in monkey, analysis of the effects of, I, II and III. Mishkin, M., and Pribram, K. H. (E.), 882, 883, 883
- Fugue, a re-evaluation of the, by W. P. Berrington, D. W. Liddell and G. A. Foulds, 280
- FULLERTON, A. G., Psychiatric uses of meratran, 801
- Ganglion paralysis in anesthesia. Hale Enderby, G. E. (E.), 667
- Ganglionic transmission, the effect of compound 48/80 on. Gertner, S. B. (E.), 668

- Ganglioplegic compounds in shock. Donati, G. S. (E.), 668
 „ drugs, application of, in general surgery. Oselladore, G., and Damia, G. (E.), 667
 „ „ clinical results of treatment of essential hypertension with. Bartorelli, C. (E.), 667
 „ „ in neurosurgery. Bozza, M. (E.), 668
 „ substances, pharmacodynamics of. Zaimis, J. (E.), 667
 Ganser state, some aspects of the, by Tyndel, M., 324
 GOLDMAN-EISLER, F., A contribution to the objective measurement of the cathartic process I, 78
 GOULD, J., Review of the Psychology of the Criminal Act and Punishment, Hypnotic Suggestion, The Phenomenological Approach to Psychiatry (R.), 365-366
 Gravitol and the autonomic system. Wyss, R. (E.), 667
 GREENBERG, H. P., Crime and *folie à deux*, 772

 Hallucinatory sense-experience, a logical and cultural analysis of, by J. R. Smythies, 336
 Hallucinogens, relationship of, to adrenergic cerebral neurohumors. Marrazzi, A. S., and Hart, E. R. (E.), 401
 Handwriting, contribution to the survey of. Bruck, M. A. (E.), 631
 HARE, E. H., Family setting and the urban distribution of schizophrenia, 753
 „ Mental illness and social conditions in Bristol, 349
 HARMS, E., Scheidemantel, F. C. G., The first systematic text in psychosomatic medicine, 300
 HARPER, J., and KLEIN, R., The problem of agnosia in the light of a case of pure word deafness, 112
 HAWKINGS, J. R., and TIBBETTS, R. W., Carbon dioxide inhalation therapy in neurosis, 52
 „ „ Intravenous acetyl choline therapy in neurosis, 43
 „ „ The placebo response, 60
 Headache, craniovascular studies in. Brazil, P., and Friedman, A. P. (E.), 649
 Head injury, metabolic disorders in. Higgins, G., *et al.* (E.), 662
 Hematoencephalic barrier, III. Kelentei, B., and Foldes, I. (E.), 654
 Hemispherectomy, examination of the sensory system in patients after. French, L. A., and Johnson, D. R. (E.), 200
 Hepatolenticular degeneration, uric acid metabolism in. Mahoney, J. P., *et al.* (E.), 401
 HES, J. PH., and BRACHA, S., The influence of reserpine on a disturbed male ward and a method for assessing this, 546
 Hexamethonium, application of, in the treatment of hypertension in man. Rosenheim, M. L. (E.), 667
 Hibicon, by J. Hoening, I. M. Crotty and W. R. Chisholm-Batten, 105
 HILL, DENIS, Clinical applications of EEG in psychiatry, 264
 Hippocampal connections and excitability, electrophysiological studies of. Green, J. D., and Aden, W. R. (E.), 877
 „ seizure states in guinea pig. Liberson, W. T., and Akert, K. (E.), 192
 HOENIG, J., CROTTY, I. M., and CHISHOLM-BATTEN, W. R., Hibicon, 105
 Hospital Psychiatry, a Handbook of, by L. Linn, review by I. Skottowe (R.), 865
 HULLIN, R. P., CROCKET, B. M., and DAWSON, J., Metabolic variations in manic-depressive psychosis, 168
 HUNTER, R. A., MACALPINE, I., and L. M. PAYNE, The country register of houses for the reception of "Lunatics", 1798-1812, 856
 Hydrazides as metabolic convulsants. Pfeiffer, C. C., *et al.* (E.), 406
 Hydrocephalus, behavior of the glucose contents of blood and CSF after sugar administration to patients with. Gnelli, U., *et al.* (E.), 204
 Hypnotic Suggestion, by S. J. Van Pelt. Review by J. Gould (R.), 366
 Hypothalamus and hypophysis, regulation of water exchange by the. Pupilli, G. C. (E.), 400
 „ of the cat, blood-sugar changes induced by electrical stimulation of the. Anand, B. K., and Sua, S. (E.), 401
 „ influence of the, on the blood lipides. Inoue, K., *et al.* (E.), 205
 Hypothalamic syndrome in rats with experimental lesions, the. Massopust, L. C. (E.), 200
 „ region of the rat brain, the feeding center of the. Forssberg, A., and Larsson, S. (E.), 656

 INGLIS, I., SHAPIRO, M. B., and POST, F., "Memory function" in psychiatric patients over sixty, etc., 589
 INGRAM, T. T. S., A characteristic form of overactive behaviour in brain damaged children, 550
 Insomnia, the use of a new preparation for cure of. Gibelline, F. (E.), 407
 Insula, the. Penfield, W., and Faulk, M. E., jun. (E.), 635
 Insulin resistance, modification of, by E. Marley, 576
 Intellectual deterioration, the use of vocabulary in the measurement of, by A. J. Yates, 409
 Isaac and Oedipus, by E. Wellisch. Review by C. E. H. Turner (R.), 366

- KAY, D. W. K., and ROTH, M., Affective disorders arising in the senium, 141
 " NORRIS, V., and POST, F., Prognosis in psychiatric disorders of the elderly, 129
- KEEHN, J. D., and SABBAGH, A., Colour-form response as a function of mental disorder, 319
- Kemadrin, a new drug for treatment of parkinsonian disease. Lerner, P. F. (E.), 889
- KING, G. M., and REES, L., Intensive cortisone therapy in schizophrenia, 155
- KLEIN, R., and HARPER, J., The problem of agnosia in the light of a case of pure word deafness, 112
- Largactil in psychosis, clinical and EEG investigation on, Szatmari, A. (E.), 868
- LEVIN, M., Varieties of disorientation, 619
- LEWIS, A., Review of *Encyclopedie medico-chirurgicale* (R.), 364
- LIDDELL, D. W., FOULDS, E. A., and BERRINGTON, W. P., A re-evaluation of the fugue, 280
- Lie Detection and Criminal Interrogation, by F. E. Inbau and J. E. Reid. Review by R. Sessions Hodge (R.), 624
- Limbic system in relation to central gray and reticulum of the brain stem, the, MacLean, P. D. (E.), 395
- LINN, L., A Handbook of Hospital Psychiatry, review by I. Stottowe (R.), 865
- Lipid chemistry of the brain in demyelinating diseases. Cumings, J. N. (E.), 635
- Lithium salts, the use of, in the treatment of manic states, by D. Rice, 604
- LSD, the action of, on mammalian cholinesterases, Thompson, R. H. S., *et al.* (E.), 654
 " experimental psychosis elicited by. Roubicek, J., and Srnc, J. (E.), 656
 " in patients with excess serotonin. Sjoerdsma, A. (E.), 871
- MACALPINE, I., PAYNE, L. M., and HUNTER, R. A., The county register of houses for the reception of "Lunatics", 1798-1812, 856
- MAGGS, R., and TURTON, E. C., EEG findings in old age and their relationship to affective disorder, 812
- Manic-depressive psychosis, metabolic variations in, by J. Dawson, R. P. Hullin and B. M. Crocket, 168
- MARLEY, E., Modification of insulin resistance, 576
- Marriage, a statistical study of the influence of, on the hospital care of the mentally sick, by V. Norris, 467
- MASON, A., Out-patient psychotherapy under the national health service, 726
- MASSERMAN, J. H., The Practice of Dynamic Psychiatry, review by I. Skottowe (R.), 864
- Maudsley Lecture, the Thirtieth: Perception and imperception, by Sir W. Russell Brain, 221
- MAXWELL, A. E., and TROUTON, D. S., The relation between neurosis and psychosis, 1
- MCADAM, W., and ROBINSON, R. A., Senile intellectual deterioration and the EEG. 819
- MCCONNELL, A. A., The cephalic post-traumatic syndrome, 330
- McKELLAR, P., and ARDIS, J. A., Hypnagogic imagery and mescaline, 22
- Mediodorsal nucleus of the thalamus, differential effects of lesions of the, on normal and neurotic behavior of the cat, Pechtel, C., *et al.* (E.), 385
- "Memory function" in psychiatric patients over sixty, etc., by M. B. Shapiro, *et al.*, 233
 " " " " " " " " " " " " J. Inglis, M. B. Shapiro and F. Post, 589
- Mental defect and deafness, an investigation into children in an attempt to differentiate between, by M. E. Dawson, *et al.*, 121
 " disorder, behaviour patterns in, by A. B. Monro, 742
 " health and disease, somatic aspects of. Richter, D. (E.), 653
 " Hospital, the, by A. H. Stanton, and M. B. Schwartz. Review by D. C. Watt, (R.), 624
 " illness and social conditions in Bristol, by E. H. Hare, 349
 " maladjustment in the East African, by C. G. Smartt, 441
- Mentally deficient boy, family periodic paralysis in a. Couston, T. A. (E.), 655
 " retarded children, chemical examination of blood in. Hirsch, W., and Fischer, E. (E.), 654
- Meratran, clinical studies on. Fobing, H. D. (E.), 181
 " the effect of, on twenty-five institutionalized mental patients. Schut, J. W., and Himwich, H. E. (E.), 181
 " and ECT, treatment of depression with. Andren, H. E. (E.), 378
 " psychiatric uses of, by A. G. Fullerton, 801
- Mescaline and LSD 25 in activation of temporal lobe epilepsy. Schwarz, B. E., *et al.* (E.), 893
 " " hypnagogic imagery, by J. A. Ardis and P. McKellar, 22
 " studies on. VI. Denber, H. C. B., and Merlis, S. (E.), 886
- Metrazol and nembutal, effect of, on motor activity in the spinal cat. Jones, D. P., and Lombroso, C. T. (E.), 406
 " induced cortical activity, effect of mesencephalic lesions on. Friedman, D. A., and Ferriss, G. A. (E.), 649

- Metrazol, strychnine and curare, influence of, on the electrical activity of the brain and cord of the salamander. Peters, J. J., *et al.* (E.), 666
- " the use of, as a mood conditioning drug. Kass, I., and Brown, E. C. (E.), 889
- Migraine, treatment of. Santiso, R. P. (E.), 666
- " type, arterenol and vascular headache of the. Ostfeld, A. M., and Wolff, H. G. (E.), 372
- Migration and Mental Disease, by B. Malzberg and E. S. Lee. Review by A. Barr, 627
- MILLER, E., Facts and fictions in the study of child psychiatry, 96
- MINSKI, L., *et al.*, An investigation into children in an attempt to differentiate between mental defect and deafness, 121
- MITCHELL, P. H., Chlorpromazine in the treatment of the chronically disturbed schizophrenic, 151
- MONRO, A. B., Behaviour patterns in mental disorder, 742
- Motor area lesions in macaca mulatta, neurological deficiencies following supplementary. Travis, M. A. (E.), 188
- " cells of the anterior cornu of frogs and toads after application of tryptaflavine, morphological changes in the. Wehling, H. (E.), 660
- Multiple sclerosis, antibrain antibodies in. Raskin, N. (E.), 186
- " " intellectual and affective functions in. Ross, A. T., and Reitan, R. M. (E.), 186
- " " hematological changes in the course of. Persson, I. (E.), 659
- " " long range treatment of, with pancorphen. Wilder, J. (E.), 389
- " " a new scale for evaluating disability in. Kurtzke, J. F. (E.), 392
- " " the long range treatment of, with pancorphen. Wilder, J. (E.), 643
- " " isonicotinic acid hydrazide in. Korengold, M. C., *et al.* (E.), 393
- " " the antihyaluronidase content of the serum in. Konyves-Kolonic, L., *et al.* (E.), 399
- " " and normal serum, phospholipide fractions in. Bernsohn, J., and Namajuska, I. (E.), 204
- " " treatment of, with low-fat diet. Swank, R. L. (E.), 186
- " " variations in the plasma fibrinogen during the course of. Persson, I. (E.), 187
- Muscular dystrophy, treatment of, with amino acids and vitamins. Wald, S. M., and Lam, R. L. (E.), 648
- Mysoline, a new anticonvulsant. Vasiliou, S. (E.), 405
- Nerve cells of the anterior horn of the spinal cord, cytochemical study on the. Tagawa, T. (E.), 662
- " conduction, effect of high-intensity X-radiation on velocity of. Gerstner, H. B., *et al.* (E.), 402
- " membranes, the ionic permeability of. Keynes, R. D. (E.), 203
- " movements of cations during recovery in. Hodgkin, A. L., and Keynes, L. D. (E.), 658
- Nervous system in children, importance of the determination of citric acid of CSF in various affections of the. Crisalli, M., and Capra, C. (E.), 204
- " " conduction and transmission of the. Crescitelli, F. (E.), 658
- " " diseases, cupremia in. Hammerschmidt, R. V. (E.), 658
- " " role of the, in the action of sympatholytic natural and reduced ergot alkaloids. Fall, S., *et al.* (E.), 667
- " " " " " " " " hypothermic action of pentamethylenetetrazole. Obal, F., *et al.* (E.), 666
- " " two pictures of the, after exposure to carbon monoxide, etc. Schilf, E. (E.), 669
- " " the thiamine dehydrogenase content of the. Titaev, A. A. (E.), 203
- " " visceral functions of the. Burn, J. H. (E.), 658
- " trophism, biochemical substrate of. Bykov, K. M., and Vasyutichkin, V. M. (E.), 402
- Neurocrinia of the hypothalamohypophyseal system, study and documentation of the, with the latest methods. Stigliani, R., and Monaci, M. (E.), 662
- Neurologic symptoms, the role of water metabolism impairments in the etiology of some. Haguénan, J., and Weil, B.
- Neurological aspects of industrial intoxication from manganese. Boyer, J., and Rodin, J. (E.), 653
- Neurons, some effects of the peripheral field on the cytochemical differentiation of. Mottet, K., and Barron, D. H. (E.), 656
- Neurophysiologic effects of electrically induced convulsions. Aird, R. B., *et al.* (E.), 870
- Neurosecretory material in the human hypothalamus, technique for demonstrating. Adams, C. W. M., and Sloper, J. C. (E.), 661
- Neurosis and psychosis, the relation between, by D. S. Trouton and A. E. Maxwell, 1
- " " " by S. B. G. Eysenck, 517

- Neurotic and psychotic depression, an objective test which differentiates between. Shagass, C., *et al.* (E.), 871
- „ suffering, the Grantham leucotomy for the relief of. Ayd, F. J. (E.), 875
- Neurovegetative system, analogy of action of substances with a different point of attack on the. Bein, J. H. (E.), 663
- NORRIS, V., POST, F., and KAY, D. W. K., Prognosis in psychiatric disorders of the elderly, 129
- „ A statistical study of the influence of marriage on the hospital care of the mentally sick, 467
- Nucleic acids and phospholipides of the rabbit brain in ontogenesis. Manukyan, K. G. (E.), 652
- Occipital lobes, dreams and psychoses. Nielsen, J. M. (E.), 385
- Olive, the inferior. Scheibel, M. E., and A. B. (E.), 195
- Out-patient psychotherapy under the national health service, by A. Mason, 726
- Oxygen deficiency in the brain, experimental study of, and its clinical significance. Petrov, I. R. (E.), 401
- Pachycarbin, pharmacological properties and application of the new drug. Mashkovskii, M. D., and Kryshova, N. A. (E.), 206
- Pantothenic acid deficiency induced in human subjects. Bean, W. B., *et al.* (E.), 660
- PARE, C. M. B., Acetylcholine as a therapeutic agent in mild psychiatric disorders, 847
- PARFITT, D. N., The neurology of schizophrenia, 671
- Parkinson's syndrome, drug therapy in. Drake, F. A. (E.), 406
- PAYNE, L. M., MACALPINE, I., and HUNTER, R. A., The county register of houses for the reception of "Lunatics", 1798-1812, 856
- Peganone, a new antiepileptic drug. Schwade, E. D., *et al.* (E.), 876
- Pentothal, notes on the use of, as an EEG activator. Plisson, M., and Rémond, A. (E.), 667
- Perception and imperception, by Sir W. Russell Brain, 221
- Perceptual anomaly, experimental studies of a, V., by A. J. Yates, 761
- Pharmacological studies on the function of the extra-pyramidal system. I and II. Kawamori, K. (E.), 407
- Pharmacotherapeutic evaluation and the psychiatric setting. Sabshin, M., and Ramot, J., 869
- Pharmacotherapy in children with psychiatric illness. Freedman, A. M., *et al.* (E.), 886
- Phenacemide (Phenurone), experimental study on the physiological distribution and metabolism of. Richards, R. K., *et al.* (E.), 406
- Phenobarbital and dilantin, a study of the anticonvulsant properties of. Chen, G., and Ensor, C. R. (E.), 406
- Phenylketonuria. IV. Brown, D. M., *et al.* (E.), 661
- „ a note on the future of, by J. E. Cawte, 805
- Phenylpyruvic oligophrenia. Perrier, F. (E.), 653
- Phosphate esters in brains, behaviour of some at the start of convulsions induced by fluorocitrate and fluoracetate. Dawson, R. M. C., and Peters, R. A. (E.), 204
- Photic stimulation, imagery and alpha rhythm, by R. H. Blum, 160
- Pigments in the cerebrospinal fluid, the nature and clinical significance of. Barrows, L. J., *et al.* (E.), 188
- Placebo response, the, by R. W. Tibbetts and J. R. Hawkins, 60
- POST, F., KAY, D. W. K., and NORRIS, V., Prognosis in psychiatric disorders of the elderly, 129
- „ SHAPIRO, M. B., and INGLIS, I., "Memory function" in psychiatric patients over sixty, etc., 589
- Precentral motor area in macaca mulatta, neurological deficiencies after ablation of the. Travis, M. A. (E.), 188
- Prefrontal leucotomy, the effects of, upon visual imagery and the ability to perform complex operations, by C. G. Costello, 507
- „ lobotomy, four years' experience with. Kral, V. A., and Elvidge, A. R. (E.), 371
- „ incidence of seizures, with EEG findings in. Klotz, M. (E.), 372
- Presenile dementia of the Jakob type. Bornstein, S., and Jervis, G. A. (E.), 634
- Procaine, role of the nervous septum in the hypothermic action of. Kelemen, A., *et al.* (E.), 666
- Psychiatric disorders, the capillary system in patients with. Doust, J. W. (E.), 643
- „ Practice, the Initial Interview in, by M. Gill, R. Newman, and E. C. Redlich. Review by D. C. Watt, 626
- Psychiatrist, the First Interview with a. By C. Berg. Review by D. C. Watt, 626
- Psychiatry, experimental. Buscaino, V. M. (E.), 651
- „ the Phenomenological Approach to, by J. H. Van Den Berg. Review by J. Gould (R.), 366
- Psychological medicine, the contribution of the physical sciences to, by John Dunne, 209

- Psychoses, drug-produced experimental. Fischer, R., and Agnew, N. (E.), 407
 " factors involved in drug-produced model. Fisher, R. (E.), 206
 Psychotic elderly, resident in a mental hospital, a review of the, by G. I. Tewfik, 247
 Pyridoxine hydrochloride in acute alcoholic intoxication. Small, M. D., *et al.* (E.), 665
 Pyruvemia in experimental pigeon polyneuritis. Chiong, C. R. (E.), 658
- REED, M., *et al.*, An investigation into children in an attempt to differentiate between mental defect and deafness, 121
 REES, L., and KING, G. M., Intensive cortisone therapy in schizophrenia, 155
 Reflex responses, the biochemical constitution of saliva in unconditioned and conditioned. Sksterikova, T. P., and Sokolova, E. A. (E.), 404
 Reserpine, a controlled study of, in chronically disturbed patients. Sommerness, M. D., *et al.* (E.), 374
 " and some barbiturates, a comparison of effects of, on the electrical activity of cortical and subcortical structures of the brain of rabbits. Rinaldi, F., and Himwich, H. E. (E.), 665
 " chlorpromazine, combined, in the treatment of disturbed psychotics. Barsa J. A., and Kline, N. S. (E.), 374
 " controlled study on clinical use of, in psychotic patients. Schrut, A. H. (E.), 887
 " Cowden, R. C. (E.), 633
 " effects in epileptic monkeys. Chusid, J. G., *et al.* (E.), 406
 " " of, on the electro-encephalic and motor reactions elicited by hypothalamic stimulation. Longo, V. G., and Napolitano, L. (E.), 664
 " " , parenteral, on cerebral blood flow, oxygen and glucose metabolism, etc. Hafkenschiel, J. H., *et al.* (E.), 665
 " further characterization of central effects of. Jurg, A., *et al.* (E.), 664
 " influences of, on ECT, by R. S. Ferguson, 826
 " in mental deficiency practice, by E. Fischer, 542
 " , the treatment of anxiety, a clinical trial of, by R. S. Ferguson, 30
 " neuropharmacological aspects of. Jurg, A., *et al.* (E.), 664
 " scalp and basal EEG during the effect of. Arellano, Z. A. P., and Jerí, R. (E.), 871
 " significance of selected central mechanisms for the analysis of the action of. Bein, H. J. (E.), 664
 " the effects of, on the chronic disturbed schizophrenic. Naidoo, D. (E.), 889
 " " influence of, on a disturbed male ward and a method for assessing this, by J. Ph. Hes, and S. Bracha, 546
 " " use of, in an acute psychiatric treatment setting. Tournay, G., *et al.* (E.), 374
 " " " " , chronic psychotic patients, by L. Wing, 530
 " treatment of headache with. Friedman, A. P. (E.), 393
 " use of, in disturbed psychotic patients. Barsa, J. A., and Kline, N. S. (E.), 632
 Reticular formation, stimulation of suprabulbar. Kelyntjiena, F., *et al.* (E.), 184
 Rhesus incompatibility and mental deficiency. Crome, L., *et al.* (E.), 635
 Rhinencephalic activity during thought. Lesse, H., *et al.* (E.), 886
 RICE, D., The use of lithium salts in the treatment of manic states, 604
 RITCHIE, E. A., Toxic psychoses under cortisone and corticotropin, 830
 ROBERTSON, J. P. S., and BATCHELDOR, K. J., Cultural aspects of the Wechsler adult intelligence scale in relation to British mental patients, 612
 ROBINSON, R. A., and McADAM, W., Senile intellectual deterioration and the EEG, 819
 Rorschach test, validity of, as measure of psychological effects of brain damage. Reitan, R. M. (E.), 184
 ROSIE, J. M., and SUTHERLAND, J. M., Cerebral cysticercosis with mental symptoms, 343
 ROTH, M., and KAY, D. W. K., Affective disorders arising in the senium, 141
 RUDOLF, G. DE M., The treatment of depression with methylamphetamine, 358
- SABBAGH, A., and KEEHN, J. D., Colour-form response as a function of mental disorder, 319
 SANDS, D. E., The psychoses of adolescence, 308
 SCHEIDEMANTEL, F. C. G., The first systematic text in psychosomatic medicine, by E. Harms, 300
 Schizoid and affective psychoses, physiologic pathology and the. Ludlum, L. I., and Driscoll, G. Z. (E.), 387
 Schizophrenia, adrenocortical function in. Bliss, E. L., *et al.* (E.), 371
 " an evaluation of the treatment of, with the antidiuretic hormone of the posterior pituitary. Westcott, G. F. (E.), 638
 " evaluation of combined coramine-ECT in the treatment of. Lighthart, P. W. K., *et al.* (E.), 631
 " use of large doses of cortisone in. Polatin, P., *et al.* (E.), 185
 " diagnostic aspects of a study of intracellular phosphorylation in. Boszor-menyi-nagy, I., and Gentv, F. J. (E.), ???
 " semen dyscrasia in. Brodny, M. L. (E.), 184

- Schizophrenia, autonomic pharmacology in. Silverstein, A., and Kline, N. S. (E.), 870
 „ comparison of chlorpromazine and reserpine in treatment of. Kurland, A. A. (E.), 871
 „ plasma tyrosine in. Miles, J. E. (E.), 645
 „ intensive cortisone therapy in, by L. Rees and G. M. King, 155
 „ family setting and the urban distribution of, by E. H. Hare, 753
 „ the neurology of, by D. N. Parfitt, 671
 Schizophrenic deterioration, some simple measures of, by A. A. Baker and J. G. Thorpe, 838
 „ blood serum, studies of the toxicity of. Edisen, C. B. (E.), 639
 „ verbal communication, the formal aspects of. Mirin, B. (E.), 641
 Seizure susceptibility in monkey cortex, regional differences in. French, J. D., *et al.* (E.), 869
 Senile dementia, spatial disorientation in, by M. Williams, 291
 „ intellectual deterioration and the EEG, by W. McAdam and R. A. Robinson, 819
 Senility, oral metrazol therapy in. Suter, W. B. (E.), 191
 Senium, affective disorders arising in the, by M. Roth, and D. W. K. Kay, II, 141
 Sensory cortex, supersensitivity of, following partial deafferentation. Spiegel, E. A., and Szekely, E. G. (E.), 379
 Serotonin, the enteric distribution of, in some large domestic mammals, etc. Faustini, R. (E.), 653
 Serpasil medication, clinical, psychological and myoneural changes in psychotic patients under oral. Finn, M., *et al.* (E.), 886
 SESSIONS HODGE, R., Review of Lie Detection and Criminal Interrogation, by F. E. Inbau and J. E. Reid (R.), 624
 Sex hormones, overcoming conditions of exhaustion by the use of. Duker, H. (E.), 668
 „ offenders, trends in the 17-ketosteroids excretion in male. Garst, J. B., and Stobin, E. K. (E.), 372
 SHAPIRO, M. B., POST, F., and INGLIS, I., "Memory function" in psychiatric patients over sixty, etc., 589
 „ *et al.*, "Memory function" in psychiatric patients over sixty, etc., 233
 SKOTTOWE, I., Review of A Handbook of Hospital Psychiatry (R.), 865
 „ The Practice of Dynamic Psychiatry (R.), 864
 Sleep, "induction of, by autonomic drugs. Szatmari, A., and Schneider, R. A. (E.), 387
 SMARTT, C. G., Mental maladjustment in the East African, 441
 SMITH, S., The use of ECT in psychiatric syndromes complicating pregnancy, 796
 SMYTHIES, J. R., A logical and cultural analysis of hallucinatory sense-experience, 336
 Sodium glutamate, some behavioral effects associated with feeding, to patients with psychiatric disorders. Himwich, H. E., *et al.* (E.), 385
 „ succinate, an analeptic for barbiturate poisoning in man. Barrett, R. H. (E.), 667
 Spinal centers, contribution of, to the action of caffeine on frog's spinal reflexes. Gualtierotti, T. (E.), 668
 Status epilepticus, a new treatment of. Bernhard, C. G., *et al.* (E.), 372
 STEWART, R. M., Cerebellar agenesis, 67
 STEWART, R. M., Encephalitis periaxialis diffusa with survival for thirty-six years, 287
 Sturge-Weber Disease, iron and calcium in, by A. H. Tingey, 178
 Subcoma insulin therapy, an evaluation of. Greaves, D. C., *et al.* (E.), 369
 Suicide, a psychiatric study of attempted, in persons over sixty years of age. O'Neal, P., *et al.*, 869
 SUTHERLAND, J. M., and ROSIE, J. M., Cerebral cysticercosis with mental symptoms, 343
 Temporal cortex of monkey, subcortical connections from. Segunds, J. P., *et al.* (E.), 185
 „ lobe lesions, experimental production of seizures in the macaque by. Youmans, J. R. (E.), 649
 TEWFIK, G. I., A review of the psychotic elderly resident in a mental hospital, 247
 Thalamic projections, observations on the diffuse. Nashold, B. S., *et al.* (E.), 640
 Thorazine, response of psychiatric patients to massive doses of. Rockmore, L., *et al.* (E.), 894
 Thorium in the brain of subjects injected with thorotrast, the qualitative and quantitative determination of. Brusa, A., *et al.* (E.), 398
 THORPE, J. G., and BAKER, A. A., Deteriorated psychotic patients, 780
 „ „ „ A research method to assess a new tranquillizing drug, 790
 „ „ „ Some simple measures of schizophrenic deterioration, 838
 Thyroid gland, effects of the so-called emotional stimulation of an animal on the functional state of the. Amiragova, M. G. (E.), 205
 Thyroidin, influence of small doses of, on the higher nervous system activity in dogs. Baranov, V. G., *et al.* (E.), 407
 Tranquillizing drug, a research method to assess a new, by J. G. Thorpe and A. A. Baker, 790

- Thalamus opticus, the conduction of pain above the level of the. Biernacki, A. (E.), 869
- TIBBETTS, R. W., and HAWKINGS, J. R., Intravenous acetyl-choline therapy in neurosis, 43
- " " " Carbon dioxide inhalation therapy in neurosis, 52
- " " " The placebo response, 60
- TINGEY, A. H., Human brain lipids at various ages in relation to myelination, 851
- " Iron and calcium in Sturge-Weber Disease, 178
- Toxic psychosis under cortisone and corticotrophin, by E. A. Ritchie, 830
- " substances in the nervous system, biochemical actions of. Elliott, K. A. C. (E.), 398
- TROUTON, D. S., and MAXWELL, A. E., The relation between neurosis and psychosis, 1
- Tuberous sclerosis, EEGs in patients with. Harvald, B., and Hauge, M. (E.), 640
- TURNER, C. E. H., Review of The Unconscious Origin of Berkeley's Philosophy, by J. H. Wisdom, 625
- " " " Isaac and Oedipus (R.), 366
- TURTON, E. P., and MAGGS, R., EEG findings in old age and their relationship to affective disorder, 812
- TYNDEL, M., Some aspects of the Ganser state, 324
- " and FORSTER, M., The neuropsychiatric aspects of familial dysautonomia, 345
- Ventricular system in hydrocephalic rat brains produced by a deficiency of vitamin B₁₂, etc. Overholser, M. D., *et al.* (E.), 401
- Vomiting. Amols, W., and Merritt, H. H. (E.), 392
- War-time Psychiatry, edited by N. D. C. Lewis and B. Engle. Review by D. C. Watt, 627
- WATT, D. C., Review of the Mental Hospital, by A. H. Stanton and M. S. Schwartz, 624; The First Interview with a Psychiatrist, 626; The Initial Interview in Psychiatric Practice, 626; War-time Psychiatry, 627
- Wechsler adult intelligence scale, cultural aspects of the, in relation to British mental patients, by J. P. S. Robertson and K. J. Batchelder, 612
- WHITTY, C. W. M., Mental changes as a presenting feature in subcortical cerebral lesions, 719
- WILLIAMS, M., Spatial disorientation in senile dementia, 291
- Wilson's disease, metabolic disturbances in. Gilsanz, V. (E.), 660
- " " " studies in using copper-64. Bearn, A. G., and Kunkel, H. G. (E.), 400
- WING, L., The use of reserpine in chronic psychotic patients, 530
- YATES, A. J., Experimental studies of a perceptual anomaly. V, 761
- " The use of vocabulary in the measurement of intellectual deterioration, 409

PART II.—AUTHORS REFERRED TO IN THE EPITOME

- Abelson, D., 655
 Abood, L. G., 408
 Ackermann, D., 654
 Ackermann, R., 654
 Adams, C. W. M., 661
 Adams, R. D., 398, 646
 Adey, W. R., 877
 Agnew, N., 407
 Aird, R. B., 870
 Alexander, L., 185
 Amiragova, M. G., 205
 Amols, W., 392
 Anand, B. K., 401
 Andren, H. E., 378
 Anthonisen, P., 402
 Aprison, M. H., 204
 Arellano, Z. A. P., 871
 Argiolas, N., 666
 Aring, C. D., 398
 Ayd, F. J., 875

 Bain, J. A., 406
 Baker, A. B., 398
 Bakulina, N. D., 653
 Baldwin, M., 893
 Balestrieri, A., 664
 Baranova, N. F., 404
 Baranov, V. G., 407
 Barber, M., 667
 Barrett, R. H., 667
 Barron, D. H., 656
 Barrows, L. J., 188
 Bargonis, N., 661, 661
 Barsa, J. A., 374, 632
 Bartorelli, C., 667
 Basmajian, J. V., 648
 Bean, W. B., 660
 Bearn, A. G., 400
 Bein, H. J., 664
 Bein, J. H., 663
 Bekaert, J., 405
 Benassi, G., 652
 Bender, M. B., 393
 Bérard, E., 663
 Bernhard, C. G., 405
 Bernhard, C. G., 372
 Berlin, L., 886
 Bernsohn, J., 204
 Biemond, A., 869
 Bliss, E. L., 371, 650
 Bohm, E., 405
 Bonafede, V. I., 372
 Bongard, W., 659
 Bonkato, A., 369
 Booi, J., 404
 Bornstein, S., 634
 Boszormengyi-nagy, I., 182
 Boyer, J., 653
 Bozza, M., 667
 Brazil, P., 649
 Brodny, M. L., 184
 Brody, H., 196
 Brown, D. M., 661
 Brown, E. C., 889
 Bruck, M. A., 631
 Bruetsch, W. L., 654
 Brusa, A., 398
 Burn, J. H., 658

 Buscaino, V. M., 651
 Bykov, K. M., 402

 Campbell, J. D., 408
 Canestrari, R., 653
 Cantarutti, F., 405
 Capra, C., 204
 Careddu, P., 399
 Carpenter, M. B., 200
 Chambers, W. W., 634
 Chamorro, A., 657
 Chen, G., 406
 Chenoweth, M. B., 399
 Chessa-Perle, E., 399
 Chetverikov, D. A., 652
 Chiong Ch, R., 658
 Chusid, J. G., 406
 Coleman, L. I. M., 634
 Courville, C. B., 637
 Couston, T. A., 655
 Costa, P. J., 187
 Cowden, R. C., 632
 Crescitelli, F., 658
 Crisalli, M., 204
 Crome, L., 635
 Cumings, J. N., 635

 Damia, G., 667
 Dasgupta, S. R., 664
 Das, N. N., 206, 207
 Davis, H., 404
 Dawson, R. M. C., 204
 Dean, W., 882
 Delay, J., 665
 Dember, H. C. B., 886
 Demeester, G., 405
 Denny-Brown, D., 639, 639
 Di Stefano, E., 652
 Donati, G. S., 668
 Dorfman, S. I., 652
 Donnet, V., 663
 Doust, J. W., 643
 Drake, F. R., 406
 Dripps, R. D., 398
 Driscoll, G. Z., 387
 Duker, H., 668

 Edisen, C. B., 639
 Edstrom, R. F. S., 649
 Efremov, V. V., 657
 Ejima, T., 659
 Elliott, K. A. C., 398, 403
 Elvidge, A. R., 371
 Enders, A., 653
 Ensor, C. R., 406
 Essex, H. E., 649

 Fabing, H. D., 385, 637
 Fadiga, E., 664
 Faeth, N. H., 871
 Fall, S., 667
 Faulk, M. E., jun., 635
 Faustini, R., 653
 Fazekas, J. F., 400
 Fazio, C., 666
 Fedeli, S., 660
 Feldman, D., 656
 Ferrannini, A., 653

 Ferrante, L., 405
 Ferriss, G. S., 649
 Finn, M., 886
 Fischer, E., 654
 Fischer, R., 407
 Fisher, J., 372
 Fisher, R., 206
 Flaherty, J. A., 630
 Fobing, H. D., 181
 Fois, A., 640
 Foldes, I., 654
 Forssberg, A., 656
 Freedman, A. M., 886
 Friedmann, A. P., 649
 French, J. D., 869
 French, L. A., 200
 Friedman, A. P., 393
 Friedman, D. A., 649
 Frowein, R. A., 663
 Fujita, F., 654
 Fujiwara, E., 665

 Gammon, G. D., 398
 Garst, J. B., 372
 Gershenovich, Z. S., 403
 Gerstner, H. B., 402
 Gertner, S. B., 668
 Gerty, F. J., 182
 Ghent, L., 882
 Gibellini, F., 407
 Gilsanz, V., 660
 Ginell, R., 656
 Gitsch, E., 658
 Glaser, G. H., 379, 402
 Goldsworthy, P. D., 206
 Golub, L. M., 379
 Gonda, T. A., 372
 Gordon, O. M., 651
 Gosling, R. H., 197
 Gouzon, B., 663
 Greaves, D. C., 369
 Green, J. D., 877
 Gross, H., 668
 Gualtierotti, T., 667, 668,
 668
 Gueli, U., 204

 Hackl, H., 668
 Hafkenschiel, J. H., 665
 Hagenau, J., 652
 Hale Enderby, G. E., 667
 Hammerschmidt, R. V., 658
 Harris, W. H., 655
 Hart, E. R., 401
 Harvald, B., 640
 Hauge, M., 640
 Hawkins, J. R., 637
 Heath, R. G., 181
 Heller, I. H., 403
 Hendershot, L. C., 399
 Henneman, D. H., 204, 654
 Hicks, S. P., 398
 Hertz, M. R., 647
 Higgins, G., 662
 Himwich, H. E., 181, 204,
 385, 665, 886
 Himwich, W. A., 886
 Hirsch, W., 654

- Hodgkin, A. L., 658
 Hokin, L. E., 400
 Hokin, M. B., 400
 Hollister, L. E., 378
 Holmberg, G., 395
 Holt, E. K., 191

 Imbriano, A. E., 400, 406
 Infantellina, F., 661
 Inoue, K., 205
 Isaja, M., 666
 Isenschmid, R., 669
 Isichenko, N. A., 203, 204
 Ito, S., 402
 Ivanov, V. I., 669

 Jeans, R. F., 871
 Jefferson, M., 657
 Jeri, R., 871
 Jervis, G. A., 634
 Johnson, D. R., 200
 Jones, D. P., 406
 Jourdan, F., 663

 Kamino, K., 408
 Kass, I., 889
 Kaverina, N. V., 668
 Kawamori, K., 407, 407
 Kelemen, A., 666
 Kelentei, B., 654
 Keller, H., 203
 Kennard, M. A., 385
 Kerken, H., 205
 Kerr, S. E., 401
 Keynes, R. D., 658
 Khayutin, V. M., 668
 Kimura, Y., 205
 King, W., 404
 Kinross-Wright, V., 182, 191
 Klenk, E., 659
 Kleyntjena, F., 184
 Kline, N. S., 374, 632, 870
 Klotz, M., 372
 Koell, G. B., 408
 Kohler, D., 667
 Konyves-Kolonics, L., 399
 Korengold, M. C., 393
 Kovitz, B., 632
 Kral, V. A., 371
 Krasnov, S. K., 400
 Krech, D., 205
 Kreuzer, F., 660
 Kryshova, N. A., 206
 Kunkel, H. G., 400
 Kurland, A. A., 387, 871
 Kurtzke, J. F., 392
 Kuusi, T. K., 658

 Lam, R. L., 648
 Lamobros, V. S., 405
 Langnickel, D., 406
 Larson, E., 408
 Larsson, S., 656
 Laursen, A. M., 195
 Lenti, C., 661, 661
 Lerner, P. F., 889
 Lesse, H., 886
 L'Helias, C., 656
 Liberson, W. T., 369
 Ligthart, P. W. K., 631
 Lippi, M., 666
 Lochrke, L. M., 647

 Logothetis, J., 393
 Lombroso, C. T., 406
 Longo, V. G., 664
 Lovett Doust, J. W., 634
 Lowry, O. H., 403
 Ludlum, L. I., 387

 MacLean, P. D., 395
 Mahoney, J. P., 401
 Maibauer, D., 205
 Malmros, H., 408
 Mangold, R., 659
 Manoilova, O. S., 653
 Manukyan, K. G., 652
 Margario, R., 667
 Marinacci, A. A., 637
 Marrazzi, A. S., 401
 Martens, S., 395
 Mashkovskii, M. D., 206
 Masserman, J. H., 868
 Massopust, L. C., 200
 Matusda, S., 203
 May, R. H., 871
 Mayer, S. E., 406
 McClymont, G. L., 662
 Merlis, S., 886
 Merritt, H. H., 392
 Mertens, H. G., 207
 Meszaros, A. F., 876
 Meyer, J. S., 639, 639, 641
 Michaelis, M., 401
 Miles, J. E., 645
 Millichap, J. G., 392
 Minz, B., 657
 Mirin, B., 641
 Mishkin, M., 882, 883, 883
 Mitolo, M., 652, 660
 Monaci, M., 662
 Moyer, J., 206
 Moyer, J. H., 206
 Mongelli Sciannameo, N., 653
 Mottet, K., 656
 Muller, O., 405
 Muramatsu, M., 669

 Naidoo, D., 889
 Nakata, F., 656
 Namajaska, I., 204
 Napolitano, L., 664
 Nashold, B. S., 640
 Nedzvetskii, S. V., 202
 Nielsen, J. M., 385
 Niwa, T., 205
 Noetzel, H., 653

 Obal, F., 666
 Odland, T., 639
 O'Neal, P., 869
 Opitz, E., 660
 Orbach, J., 883
 O'Reilly, P. O., 876
 Orunesu, M., 661
 Oselladore, G., 667
 Ostfeld, A. M., 372
 Overholser, M. D., 401

 Pechtel, C., 385, 858
 Penfield, W., 635
 Perrier, F., 653
 Persson, I., 187, 659
 Peters, J. J., 666

 Peters, R. A., 204
 Petrov, I. R., 401
 Pfeiffer, C. C., 406
 Pichot, P., 187
 Platonov, E. G., 402
 Plissin, M., 667
 Polatin, P., 185
 Pope, A., 891
 Porter, H., 646
 Portheine, F., 665
 Prazzoli, A., 666
 Previtera, L., 652
 Pribram, K. H., 882, 883, 883
 Proctor, R. C., 639
 Prokhorova, M. I., 655
 Pruckner, G., 404
 Pscheidt, G. R., 401
 Pupilli, G. C., 400

 Ramot, J., 870
 Raskin, N., 186
 Ratnitskaya, S. S., 202
 Reitan, R. M., 184, 186
 Reitinger, J., 658
 Rémond, A., 667
 Reynes, R. D., 203
 Richards, R. K., 406
 Richter, D., 653
 Rinaldi, F., 371, 632, 665, 886
 Rinkel, M., 182
 Rockmore, L., 894
 Rodin, J., 653
 Rohr, H., 206
 Rosner, H., 887
 Ross, A. T., 186
 Rozenberg, P. A., 669
 Rosenheim, M. L., 667
 Ruccia, D., 660

 Sabshin, M., 870
 Santiso, R., 666
 Satoyoshi, E., 402
 Saunders, J. W., 658
 Scheibel, A. B., 195
 Scheibel, M. E., 195
 Schief, E., 669
 Schliecker, W., 399
 Schlosser, L., 205
 Schmidt, R. M., 399
 Schminke, G. A., 205
 Schmizu, N., 196
 Schneider, J. A., 664, 664
 Schneider, R. A., 387
 Schnell, H., 374
 Schultz, J. D., 202
 Schumann, H. J., 403
 Schut, J. W., 181
 Schwade, E. D., 876
 Schwarz, B. E., 893
 Schwuttke, G., 404
 Segunds, J. P., 185
 Sem-Jacobsen, C. W., 877
 Setchell, B. P., 662
 Shagass, C., 871
 Shapiro, A. K., 889
 Shipitsyn, S. A., 652
 Shrut, A. H., 887
 Siegel, B. V., 658
 Silverstein, A., 870
 Sjoerdsma, A., 871

- Skesherikova, T. P., 404
 Sloper, J. C., 661
 Small, M. D., 665
 Smirnov, A. A., 652, 652
 Sobek, V., 207
 Sokolova, E. A., 404
 Sokoloff, L., 659
 Solé, A., 655
 Sommerness, M. D., 374
 Sonnenblick, E. H., 655
 Spiegel, E. A., 379
 Sprague, J. M., 634
 Stammler, A., 405
 Steger, J., 399
 Steger, R., 399
 Stigliani, R., 662
 Stobin, E. K., 372
 Strickland, K. P., 662
 Strominger, J. L., 403
 Sua, S., 401
 Suter, W. B., 191
 Sutherland, V. C., 400
 Swank, R. L., 186
 Szatmari, A., 387, 648, 868
 Szekely, E. G., 379
 Tagaki, H., 666
 Tagawa, T., 662
 Takagaki, G., 202, 651, 657
 Takeda, T., 203
 Takenaka, F., 407
 Teng, P., 393
 Thomas, M. H., 648
 Thompson, R. H. S., 654
 Tichy, F. Y., 398
 Tsukada, Y., 657
 Thompson, R., 882
 Thompson, R. H. S., 662
 Titaev, A. A., 203
 Toman, J. E. P., 871
 Torda, C., 205
 Tournay, G., 374
 Toyota, M., 655
 Travis, A. M., 188, 188
 Trufant, S. A., 398
 Tsukada, Y., 202
 Turner, M., 663
 Tutaev, G. V., 203, 204
 Val'dman, A. V., 669
 Vasyatichkin, V. M., 402
 Victor, M., 398
 Vincent, V., 663
 Voegelé, G. E., 871
 Volk, B. W., 871
 Waked, N., 401
 Wald, S. M., 648
 Wang, S. C., 663
 Wehling, H., 660
 Weil, A. A., 643
 Weil, B., 652
 Westcott, G. F., 638
 Wilder, J., 389, 643
 Woishi, J. R., 404
 Wolff, H. G., 372
 Wright, J. T., 408
 Wyss, R., 667
 Youmans, J. R., 649
 Zaimis, J., 667
 Zetler, G., 205

Look this
 up in
 the
 index

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CONTENTS FOR JANUARY, 1956

Original Articles—

	PAGE
The Relation Between Neurosis and Psychosis; by <i>D. S. Trouton, M.A., M.Sc., M.B., B.Chir., and A. E. Maxwell, M.A., B.Sc., B.Ed.</i>	1
Hypnagogic Imagery and Mescaline; by <i>J. Amor Ardis, M.B., Ch.B., D.P.M., and Peter McKellar, M.A., Ph.D.</i>	22
A Clinical Trial of Reserpine in the Treatment of Anxiety; by <i>R. S. Ferguson, M.B., Ch.B.</i>	30
Intravenous Acetyl Choline Therapy in Neurosis; by <i>J. R. Hawkings, M.B., D.P.M., and R. W. Tibbetts, M.A., B.M., D.P.M.</i>	43
Carbon Dioxide Inhalation Therapy in Neurosis; by <i>J. R. Hawkings, M.B., D.P.M., and R. W. Tibbetts, M.A., B.M., D.P.M.</i>	52
The Placebo Response; by <i>R. W. Tibbetts, M.A., B.M., D.P.M., and J. R. Hawkings, M.B., D.P.M.</i>	60
Cerebellar Agenesis; by <i>R. M. Stewart, M.D., F.R.C.P.</i>	67
A Contribution to the Objective Measurement of the Cathartic Process—I; by <i>Frieda Goldman-Eisler, Ph.D.</i>	78
Facts and Fictions in the Study of Child Psychiatry; by <i>Emmanuel Miller, M.A.(Cantab.), F.R.C.P., D.P.M.</i>	96
Hibicon; by <i>J. Hoenig, I. M. Crotty, and W. R. Chisholm-Batten</i>	105
The Problem of Agnosia in the Light of a Case of Pure Word Deafness; by <i>R. Klein, M.D., and J. Harper, M.B.E., M.B., M.R.C.P.E., D.P.M.</i>	112
An Investigation into Children in an Attempt to Differentiate Between Mental Defect and Deafness; by <i>M. E. Dawson, Ph.D., B.Sc., M. J. Evans, B.Sc., M. Reed, B.Sc., and Louis Minski, M.D., F.R.C.P.</i>	121
Prognosis in Psychiatric Disorders of the Elderly; by <i>D. W. K. Kay, M.B., B.Ch., D.P.M., Vera Norris, Ph.D., M.B., Ch.B., and Felix Post, M.B., M.R.C.P., D.P.M.</i>	129
Affective Disorder Arising in the Senium; by <i>Martin Roth, M.D., M.R.C.P.(Lond.), D.P.M., and D. W. K. Kay, M.A., B.M., B.Ch., D.P.M.</i>	141
II. Physical Disability as an Aetiological Factor	141
Chlorpromazine in the Treatment of the Chronic Disturbed Schizophrenic Patient; by <i>P. H. Mitchell, M.A., M.D.(Cantab.), D.P.M.</i>	151
Intensive Cortisone Therapy in Schizophrenia; by <i>Linford Rees, M.D., B.Sc., M.R.C.P., D.P.M., and G. M. King, M.R.C.S., L.R.C.P.</i>	155
Photic Stimulation, Imagery, and Alpha Rhythm; by <i>Richard H. Blum</i>	160
Metabolic Variations in Manic-Depressive Psychosis; by <i>J. Dawson, M.Sc., M.B., Ch.B., R. P. Hullin, Ph.D., M.Sc., A.R.I.C., and Beatrice M. Crocket, M.B., Ch.B., D.Psych.</i>	168
Iron and Calcium in Sturge-Weber Disease; by <i>A. H. Tingey, M.A.</i>	178

Bibliography and Epitome

181

